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shock waves	organic compounds
handbook	thermodynamic properties
alloys	very high pressures
equations of state	mixtures

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This volume consists of 4 parts including the index for the three volume compendium. Section C lists shock wave data for organic compounds. Section D contains shock wave data for mixtures of organic and inorganic data. Section E lists data for incompletely defined engineering and geological materials.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

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UCLR-50108 Vol. 3

COMPENDIUM OF SHOCK WAVE DATA

Section C - Organic Compounds
Excluding Hydrocarbons
Section D - Mixtures
Section E - Mixtures and Solutions
Without Chemical
Characterization
Compendium Index

General Editor: M. van Thiel
Assistant Editors: J. Shaner
E. Salinas
Programmer: T. Michels
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MS. date: June 1977

UCRL-50108 Vol. 3

COMPENDIUM OF SHOCK WAVE DATA

SECTIONS C-E

M. van Thiel

June 1977

Notice

The completeness of this compilation depends upon its users. To assure its continued usefulness, users are urged to send any missing or new shock wave data and corrections to the Editor, M. van Thiel, Lawrence Livermore Laboratory, P.O. Box 808, Livermore, California, U.S.A., 94550.

New and revised pages will be distributed as necessary.

UCRL-50108 VOL 3$ COMPENDIUM OF SHOCKWAVE

DATA SECTIONS C-E M. VAN THIEL JUN 77

UNC AAN7 - -

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
B														
C														
D														
E														
F														
G														
H														

S E C T I O N   C

ORGANIC COMPOUNDS EXCLUDING HYDROCARBONS

23-2-1(1-4-1)---1
METHANOL

H3-C-O-H = C-H4-O

TO = 15-24 DEG. CENTIGRADE
VO = 1.255-1.271 CC/G.

CO = 1.125 KM/SEC.
AT 20 DEG CENTIGRADE

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC., PRESSURE IN KILOBARS, DENSITY IN G/CC AND TEMPERATURE IN DEG. CENTIGRADE.

TABLE

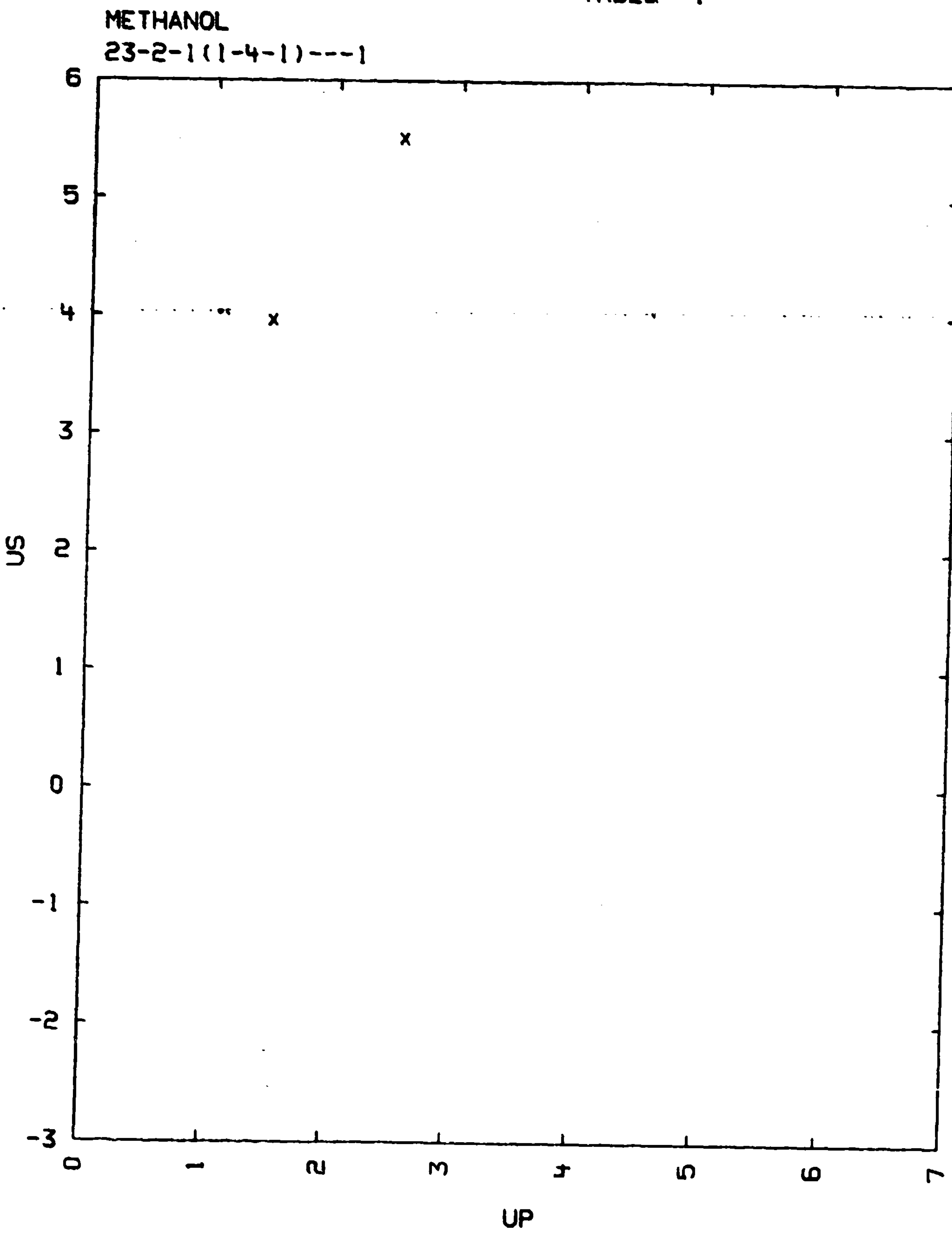
TO	RHOO	US	UP	P	V/VO
24	0.7868	5.51	2.525	109.5	0.542
15	0.7968	3.95	1.483	46.6	0.625

US = 1.73 + 1.50*UP KM/SEC

COMMENTS:

1) SOURCE: WALSH J. M. AND RICE M. H.
JOURNAL OF CHEMICAL PHYSICS, VOL. 26, P. 815 (1957)
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL 24ST ALUMINUM
3) CO WAS OBTAINED FROM: BERGMANN, DER ULTRASCHALL (S. HIRZEL VERLAG STUTTGART, GERMANY, 1954).
4) ALSO FROM BERGMAN THE TEMPERATURE DERIVATIVE DC/DT = 0.0033 KM/SEC
(DC/DT) = -0.0033 KM/(SEC*DEG)

TABLE I



23-2-1(2-6-1)---1
ETHYL ALCOHOL

H3-C-C(H2)-O-H = C2-H6-O

T0 = 21-26 DEG. CENTIGRADE
V0 = 1.267-1.275 CC/G   C0 = 1.141-1.162 KM/SEC.

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC., PRESSURE IN KILOBARS, DENSITY IN G/CC AND TEMPERATURE IN DEG. CENTIGRADE.

TABLE

T0	RHO0	US	UP	P	V/V0
26	0.7843	5.63	2.500	110.4	0.556
21	0.7893	4.03	1.487	47.3	0.631

US = 1.68 + 1.58*UP KM/SEC

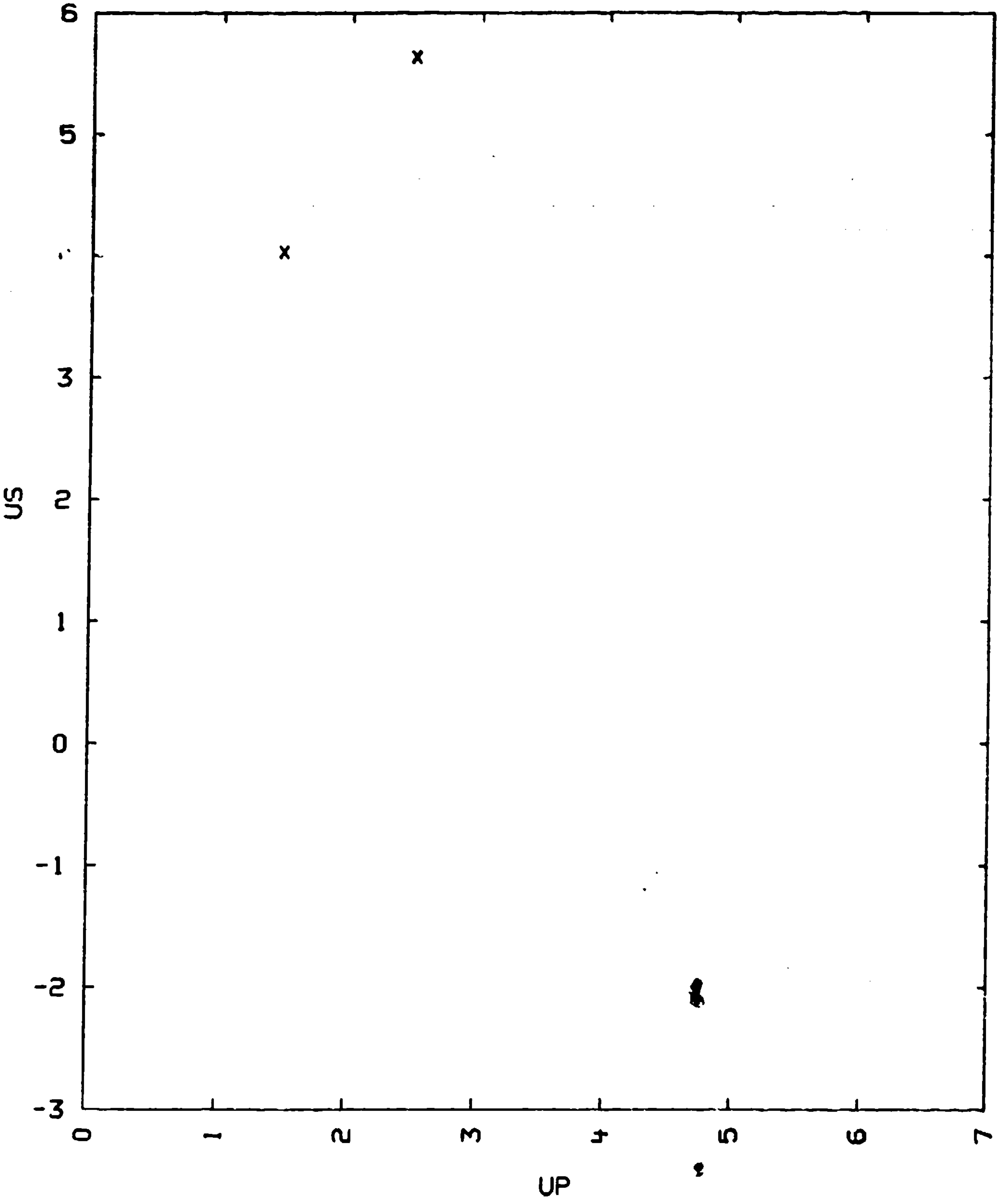
COMMENTS:

1) SOURCE: WALSH J. M. AND RICE M. H.
   JOURNAL OF CHEMICAL PHYSICS, VOL. 26, P. 815 (1957)
2) EXPERIMENTAL TECHNIQUE B
   DATA REDUCTION TECHNIQUE B
   STANDARD MATERIAL 24ST ALUMINUM
3) THE VALUES FOR C0 WERE DETERMINED BY INTERPOLATING THE DATA POINTS OBTAINED FROM THE AMERICAN INSTITUTE OF PHYSICS HANDBOOK, (MCGRAW-HILL BOOK CO., N. Y. 1963) 2ND ED.

TABLE I

ETHYL ALCOHOL

23-2-1(2-6-1)---1



23-2-1(2-6-1)---2
ETHANOL

C(H3)-C(H2)-O-H

TO =25-30 CO(T=20 DEG.C.)=1.162 KM/SEC
VOI=1.2738-1.2808 G/CC

THE TABLE LISTS T IN DEG. C., RHOO IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KBAR. RI IS REFRACTIVE INDEX. AL IS 2024 AL, BR: 346 BRASS

TABLE

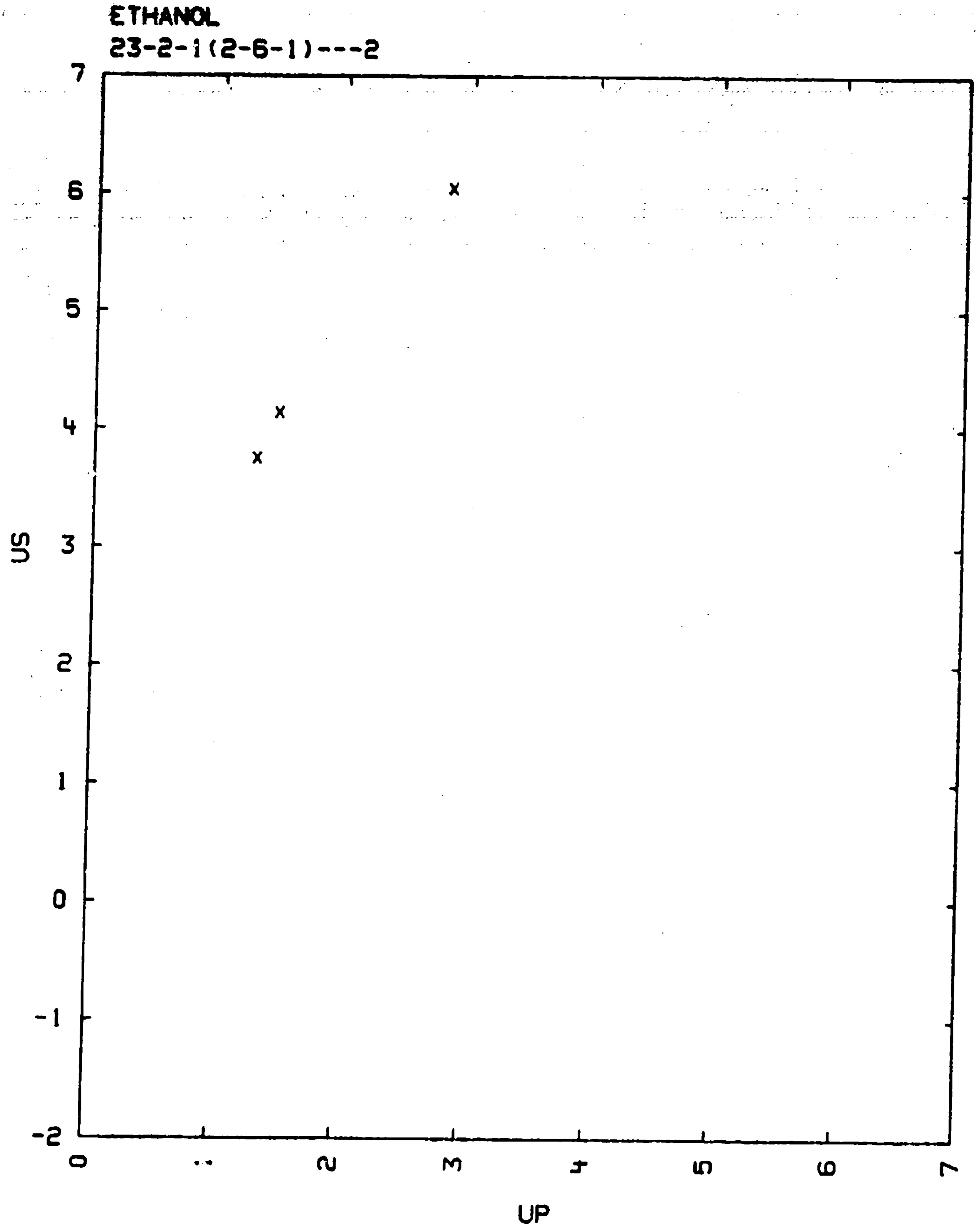
SAMPLE							DRIVER	
TO	RHOO	US	UP	P	V/VO	RI	UFS	MAT
30.	0.7807	3.74	1.32	35.8	0.6471	1.564	1.55	AL
28.	0.7825	4.13	1.485	48.0	0.6404	1.562	1.77	AL
25.	0.7851	6.04	2.84	134.7	0.5298	1.688	3.23	BR
20.	0.7894			0.0	1.00	1.362		

US =

COMMENTS:

1) SOURCE: AHRENS T.J. AND RUDERMAN M.H.
J. APPL. PHYS. V.40, P.3044 (1969)
2) EXPERIMENTAL TECHNIQUE: D AN CI
DATA REDUCTION METHOD : B
3) VOI AND RHOO WERE CALCULATED FROM:
RHOO = 0.78506-8.591E-4(T-25)-5.6E-7(T-25)**2-5.E-9(T-25)**3
AMERICAN INST. OF PHYS. HANDBOOK, D.E. GRAY EDITOR (MCGRAW HILL BOOK CO 1972) 3RD.ED.
4) UNCERTAINTIES: US =1-1.5 PERCENT
UP =2.5 - MAXIMUM
RI =1.3 -
5) CO SAME SOURCE AS VOI

TABLE I



23-2-1(2-6-2)---3
ETHANOL

C(H3)-C(H2)-O-H

TO =20-38 DEG.C.
VOI=1.2669-1.2923 CC/G

THE TABLE LISTS TO IN DEG.C., RHOO IN G/CC., VELOCITIES IN KM/SEC. AND P IN KBAR. RI IS REFRACTIVE INDEX

TABLE

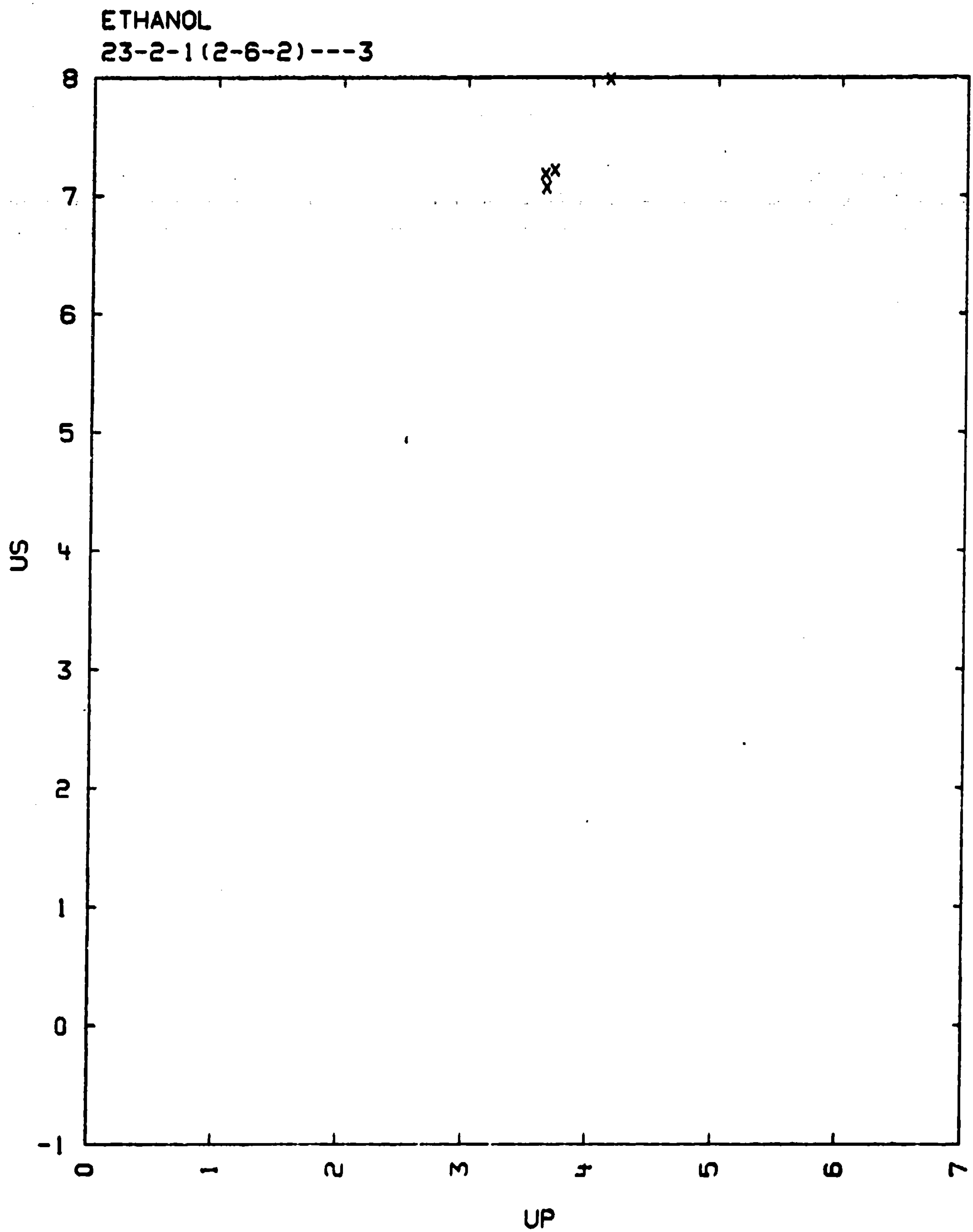
TO	RHOO	US	UP	P	V/VO	RI
20.	0.7894	7.18	3.62	205.	0.4958	1.739
36.	0.7755	7.06	3.63	199.	0.4858	1.73
32.	0.7790	7.98	4.14	257.	0.4812	1.741
38.	0.7738	7.21	3.70	206.	0.4868	1.757

US =

COMMENTS:

1) SOURCE: PETERSEN C.F. AND ROSENBERG J.T.
J. APPL. PHYS. V.40, P.3044 (1969)
2) EXPERIMENTAL TECHNIQUE: D AND CI
DATA REDUCTION METHOD : B
3) VOI AND RHOO WERE CALCULATED FROM
RHOO = 0.78506-8.5E-4(T-25)-5.6E-7(T-25)**2-5.0E-9(T-25)**3 G/CC
AMERICAN INST. OF PHYS. HANDBOOK, D.E. GRAY, EDITOR (MCGRAW HILL BOOK CO. 1972) 3RD. ED.

TABLE I



23-2-1(3-6-1)---1
ACETONE

H3-C-C(O)-C-H3 = C3-H6-O

T0 = 26-30 DEG. CENTIGRADE
V0 = 1.274 - 1.279 CC/G   C0 = 1.18 - 1.16 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC., PRESSURE IN KILOBARS, DENSITY IN G/CC AND TEMPERATURE IN DEG. CENTIGRADE.

TABLE

TO	RHOO	US	UP	P	V/VO
26	0.7849	5.37	2.510	105.6	0.533
30	0.7819	3.97	1.495	46.4	0.623

US = 1.91 + 1.38*UP KM/SEC

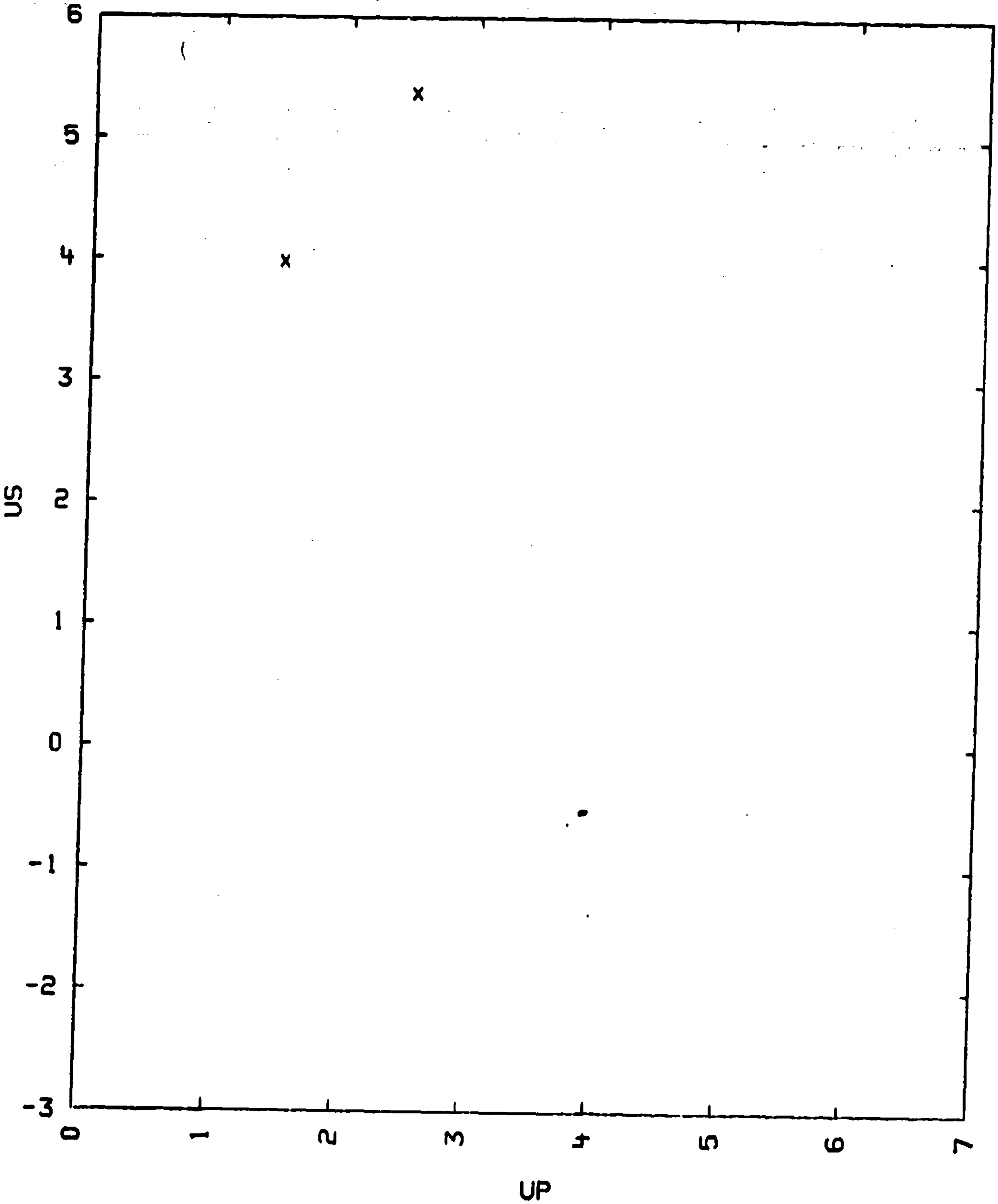
COMMENTS:

1) SOURCE: WALSH J. M. AND RICE M. H.
JOURNAL OF CHEMICAL PHYSICS, VOL. 26, P. 815 (1957)
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL 24ST ALUMINUM
3) THE VALUES FOR C0 WERE OBTAINED FROM THE AMERICAN INSTITUTE OF PHYSICS HANDBOOK, (MCGRAW-HILL BOOK CO., N. Y. 1963) 2ND ED.

TABLE I

ACETONE

23-2-1(3-6-1)---1



23-2-1(3-8-3)---1
GLYCERINE

H-O-C(H2)-C(H)(O-H)-C(H2)-O-H = C3-H8-O3

TO = 18-30 DEG. CENTIGRADE
VO = 0.794-0.798 CC/G.

CO = 1.923 KM/SEC
AT T = 20 DEG CENTIGRADE

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC., PRESSURE IN KILOBARS, DENSITY IN G/CC AND TEMPERATURE IN DEG. CENTIGRADE

TABLE

TO	RHOO	US	UP	P	V/VO
30	1.253	6.07	2.240	170.3	0.631
18	1.259	4.58	1.328	76.6	0.710

US = 3.07 + 1.34*UP KM/SEC

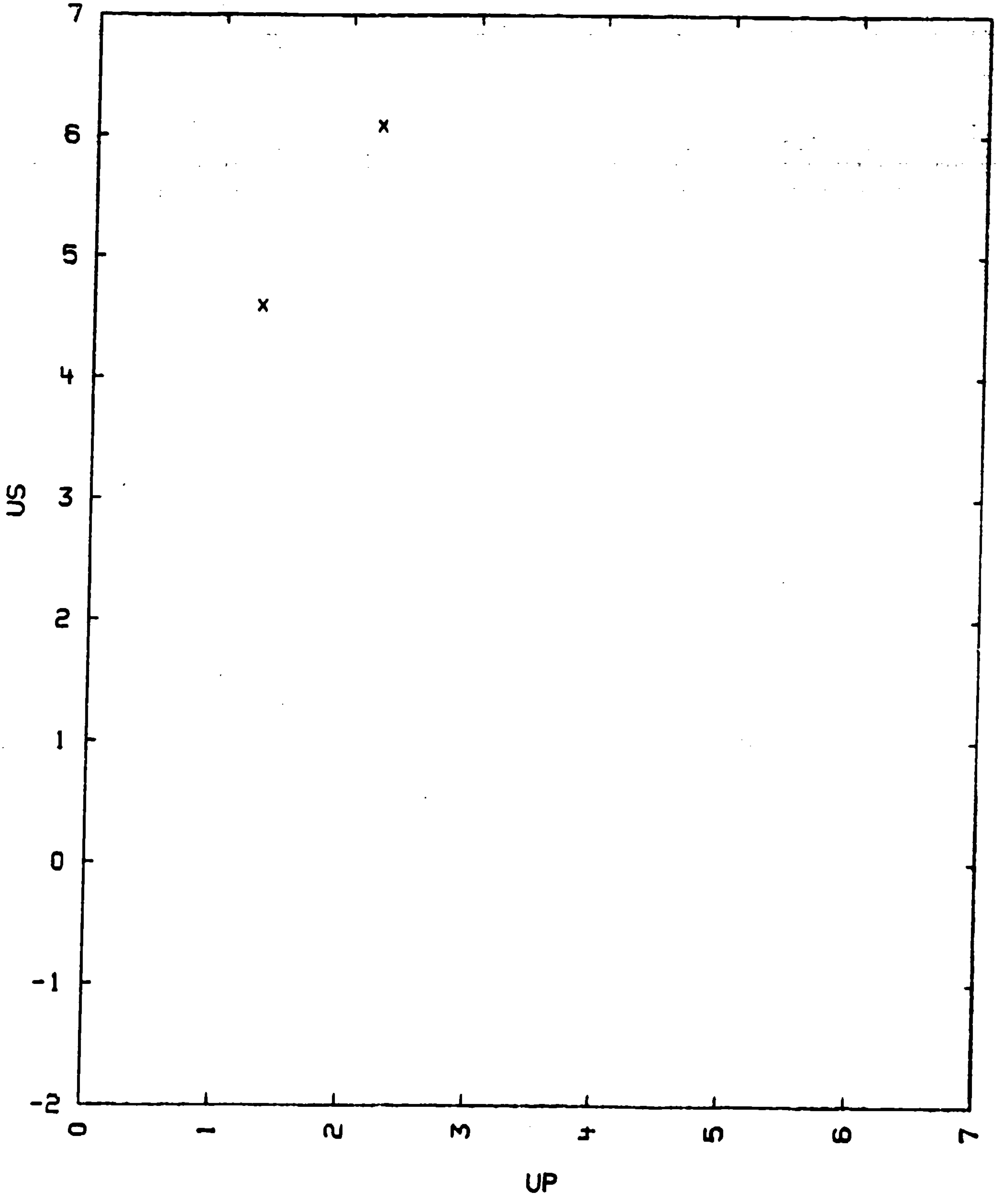
COMMENTS:

1) SOURCE: WALSH J. M. AND RICE M. H.
JOURNAL OF CHEMICAL PHYSICS, VOL. 26, P. 815 (1957)
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL 24ST ALUMINUM
3) THE VALUE OF CO AND THE DERIVATIVE (DCO/DT) = -0.0018 KM/(SEC.DEG)
FROM: BERGMANN,DER ULTRASCHALL, S. (S. HIRZEL VERLAG, STUTTGART 1954)
4) ONE DATA POINT WAS OBTAINED BY:
J. B. RAMSAY PRIVATE COMMUNICATION (1966)
LOS ALAMOS SCIENTIFIC LAB., LOS ALAMOS, NEW MEXICO.

TO	RHOO	US	UP	P	V/VO
20	1.261	5.770	2.02	146.	0.650

TABLE I

GLYCERINE
23-2-1(3-8-3)---1



23-2-1(3-8-3)+--2
GLYCERIN (GLYCEROL)

H-O-C(H2)-C(H)(O-H)-C(H2)-O-H = C3-H8-O3 REMAINDER
H2-O SEE COMMENT 6

TO = 25-28 DEG.C.
VO = 0.8010-0.8022
VOI= 0.7956-0.7968

THE TABLE LISTS T IN DEGREES C, RHO IN G/CC., VELOCITIES IN KM/SEC AND P IN KBARS. RI IS REFRACTIVE INDEX. AL IS 2024 ALUMINUM, BR 346 BRASS

TABLE

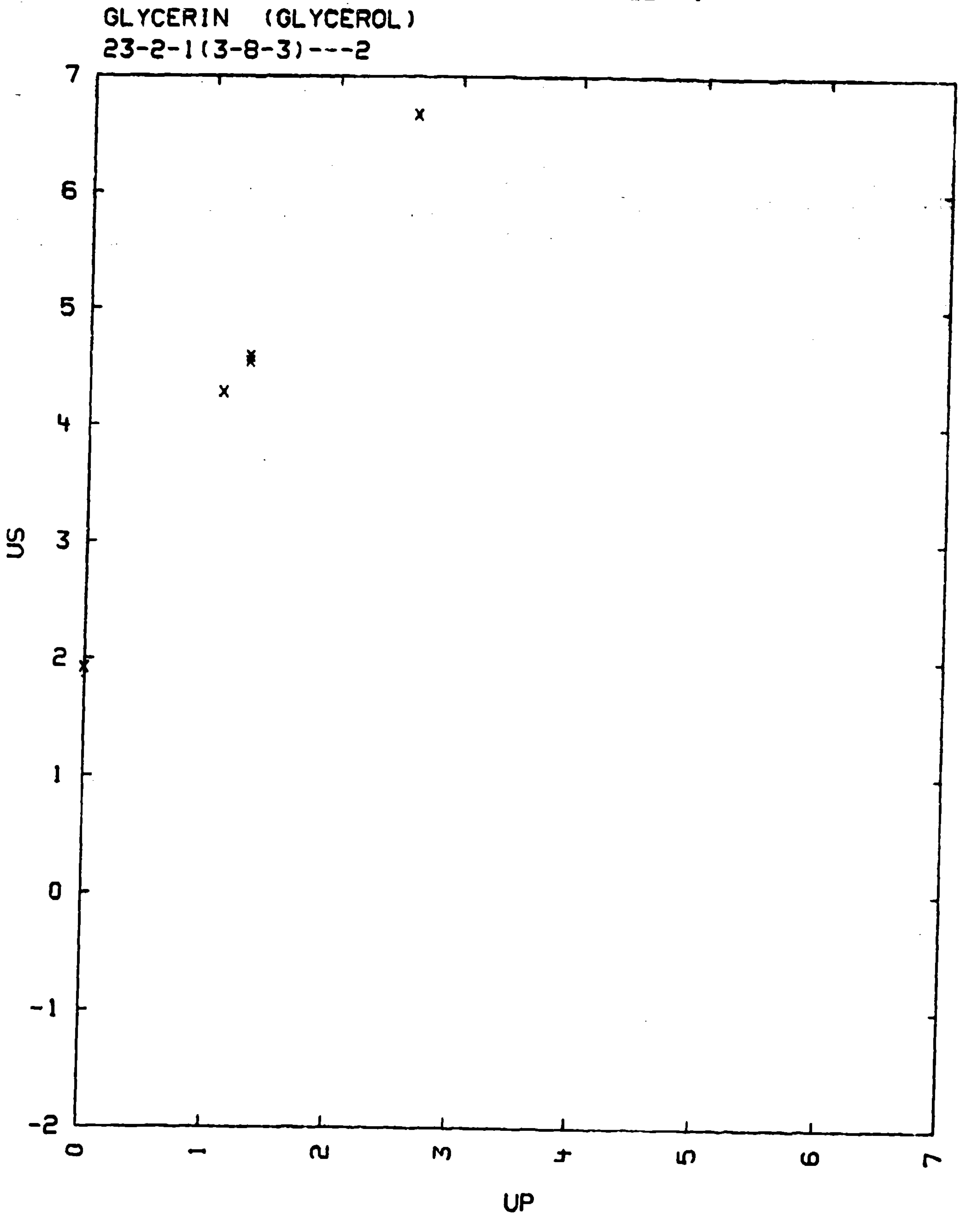
- - - - - - - - - SAMPLE						- - - - - - - - - - -	-DRIVER-	
TO	RHOO	US	UP	P	V/VO	RI	UFS	MAT
28.	1.246	4.28	1.10	58.7	0.743	1.616	1.46	AL
25.	1.248	4.54	1.32	74.8	0.709	1.667	1.77	AL
25.	1.248	4.59	1.32	75.6	0.712	1.656	1.77	AL
25.	1.248	6.67	2.64	220.	0.604	1.755	3.23	BR
24.	1.249	1.92	0.0	0.0	1.000	1.468	0.0	

US =

COMMENTS:

1) SOURCE: AHRENS T.J. AND RUDERMAN M.H.
J. APPL. PHYS. V.37 P.4758 (1966)
2) EXPERIMENTAL TECHNIQUE: D AND CI
DATA REDUCTION METHOD : B
3) VOI IS CALCULATED FROM V=(0.505(T-20)+1)V20=(1+.4853T+.4895*T**2)VO WHERE T IS IN DEG. C. AND V IN CC/G. VO IS THE VALUE AT T=0.0 DEG. C. AMERICAN INST. OF PHYS. HANDBOOK, D.E.GRAY EDITOR (MCGRAW-HILL BOOK CO. 1972) 3RD ED.
4) V WAS CALCULATED FROM A DENSITY MEASUREMENT AT 23.8 DEG.C. = 1.2492 + OR- 0.0005 G/CC.; SIMILARLY RHOO.
5) UNCERTAINTIES US=1-1.5 PERCENT
UP=2.5
RI=1.3
6) ALL RI VALUES ARE NORMALIZED TO THE VALUE AT P=0 OBTAINED FROM 0.965*RI(GLYC.) + 0.035*RI(WATER) = 1.468

TABLE I



23-2-1(3-8-3)---3
GLYCERIN (GLYCEROL)

H-O-C(H2)-C(H)(O-H)-C(H2)-O-H = C3-H8-O3   99.4 PERCENT OR GREATER

TO =20-38 DEG.C.   CO(T=20 DEG.C.)= 1.923 KM/SEC.
VOI=0.7936-0.8009 CC/G

THE TABLE LISTS TO IN DEG.C., VELOCITIES IN KM/SEC, RHOO IN G/CC AND P IN KBARS. RI IS REFRACTIVE INDEX

TABLE

TO	RHOO	US	UP	P	V/VO	RI
20.	1.260	7.76	3.17	310.	0.591	1.714
36.	1.250	7.74	3.17	307.	0.590	1.732
32.	1.252	8.52	3.83	408.	0.550	1.813
38.	1.249	7.88	3.42	337.	0.566	1.802

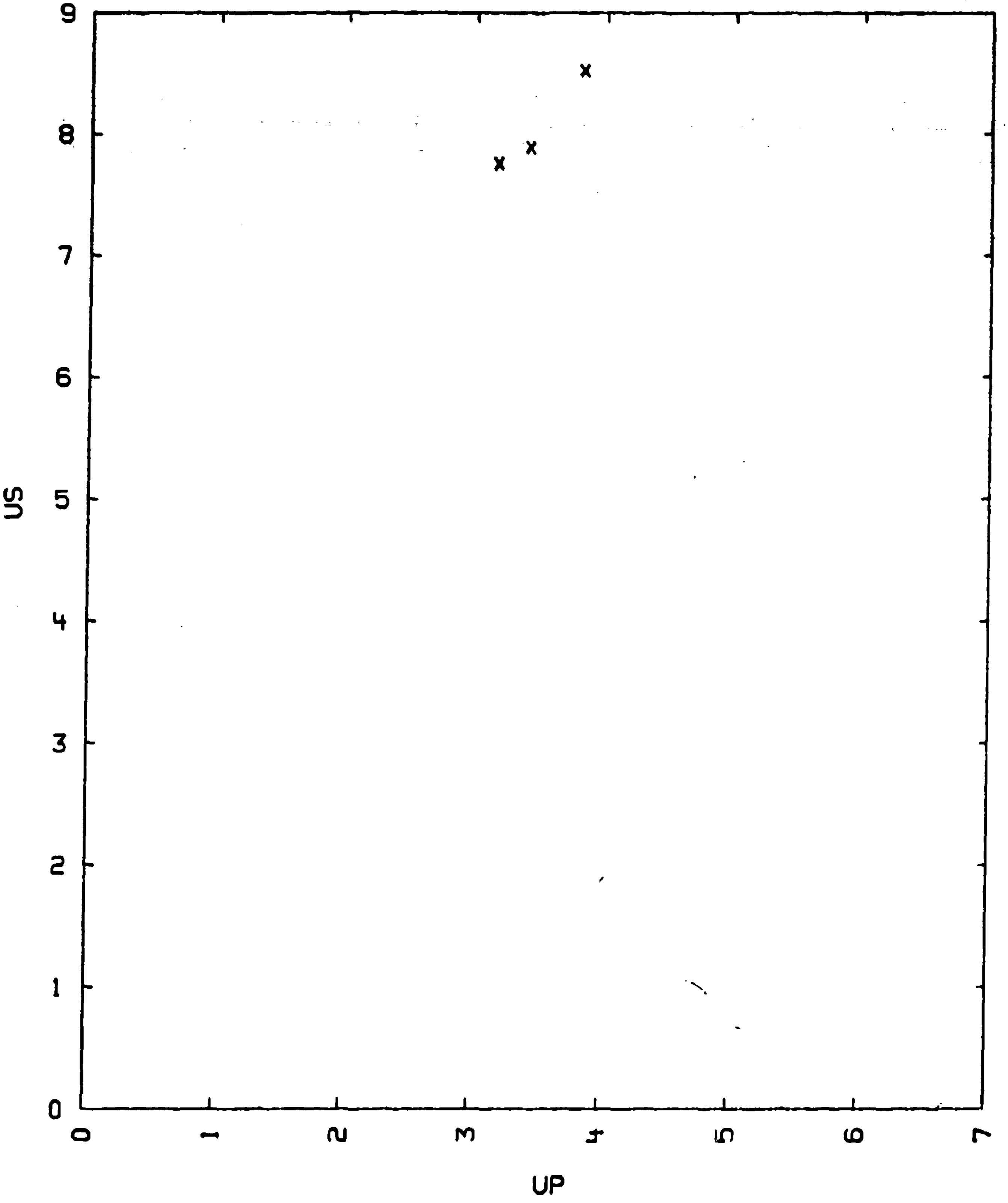
US =

COMMENTS:

1) SOURCE: PETERSEN C.F. AND ROSENBERG J.T.
J. APPL. PHYS. V.40 P.3044 (1969)
2) EXPERIMENTAL TECHNIQUE: D AND CI
DATA REDUCTION METHOD : B
3) VOI AND RHOO FROM V=(1+.4853E-3*T + .4895E-6*T**2)VO. HERE VO IS THE VOLUME AT T=0 DEG. C. AMERICAN INST. OF PHYS. HANDBOOK. D.E. GRAY, EDITOR (MCGRAW HILL BOOK CO. 1972) 3RD. ED.
4) CO FROM L. BERGMAN, DER ULTRASCHALL. (S. HIRZEL VERLAG, STUTTGART 1954)

TABLE I

GLYCERIN (GLYCEROL)
23-2-1(3-8-3)---3



23-2-1(4-10-1)---1
ETHYL ETHER (ETHER)

C2(H5)-O-C2(H5) = C4-H10-O

V0 = 1.41 CC/G
V0I = 1.4015 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICRO-SEC, AND PRESSURE IN KILOBARS.

TABLE

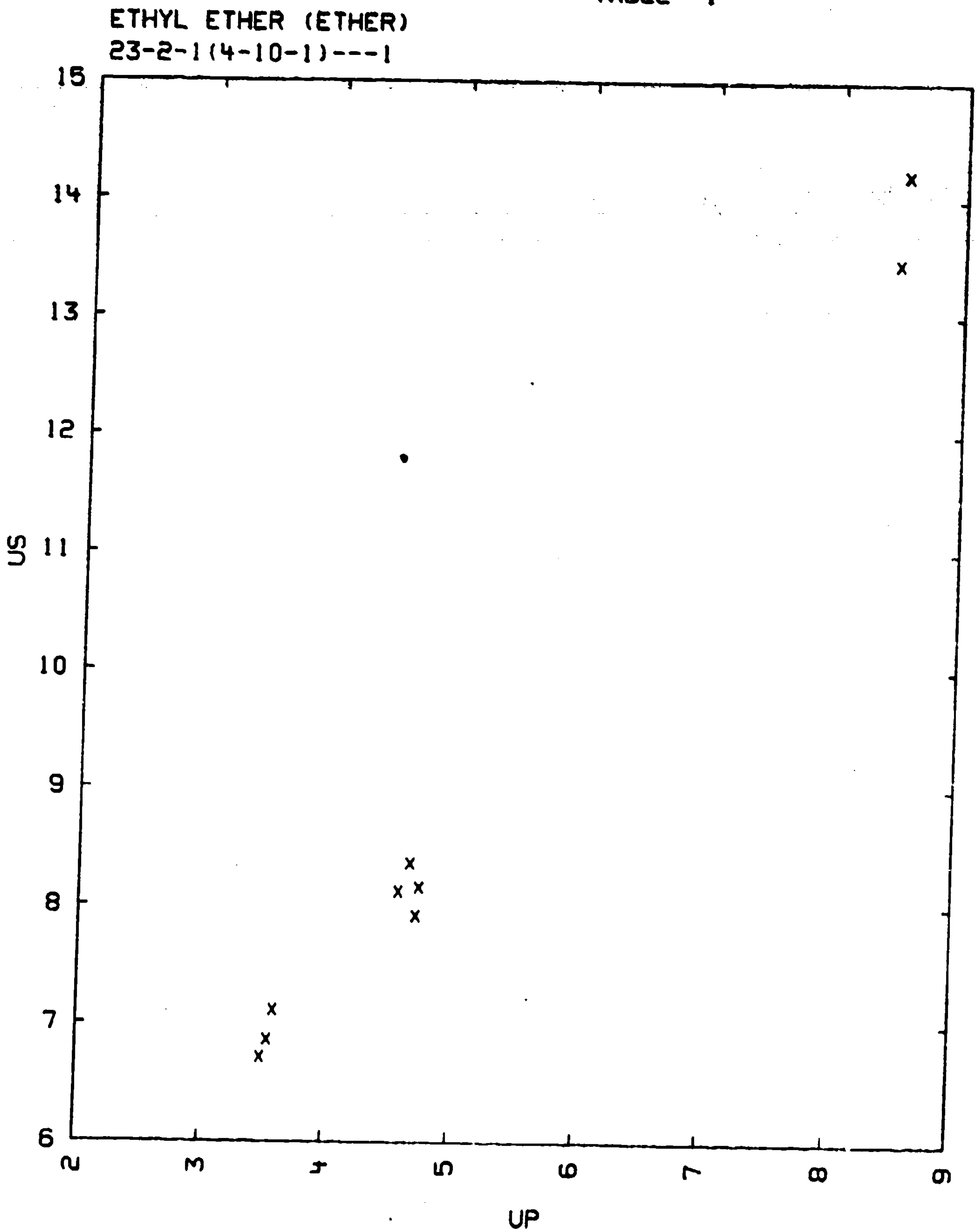
RHO0	US	UP	P	V/V0
0.71	6.71	3.50	170	.478
-	6.86	3.55	175	.487
-	7.11	3.59	180	.496
-	8.12	4.58	260	.434
-	7.92	4.72	261	.387
-	8.36	4.67	275	.455
-	8.15	4.74	278	.415
-	13.46	8.47	810	.371
-	14.21	8.52	860	.400

US = 1.69 + (1.42)UP MM/MICROSEC

COMMENTS:

1) SOURCE: SKIDMORE, I.C. AND MORRIS, E.
THERMODYNAMICS OF NUCLEAR MATERIALS, P. 173 FF. (1962)
INTERN. AT. ENERGY AGENCY, VIENNA
ATOMIC WEAPONS RESEARCH ESTABLISHMENT, ALDERMASTON, ENGLAND
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B
THE SHOCK WAS PRODUCED BY AN EXPLOSIVELY ACCELERATED EN3 STEEL PLATE.
THE SHOCK WAS TRANSMITTED THROUGH A STEEL PLATE INTO THE SAMPLE.
3) THE VELOCITY OF THE FLYING PLATE AND THE SHOCK AND SURFACE VELOCITY OF THE TARGET PLATE WERE MEASURED AS WELL AS THE SAMPLE SHOCK VELOCITY.
4) DATA SCATTER WAS ABOUT 0.03 MICROSEC.
5) CORRECTIONS WERE MADE FOR FLYING PLATE CURVATURE OF UP TO 1 MICROSEC.
6) THE HIGHER PRESSURES WERE OBTAINED BY A SPHERICALLY CONVERGING SYSTEM.
7) ALL PELLETS WERE SURROUNDED BY LEAD TO REDUCE LATERIAL RAREFACTION.
8) V0I IS THE 20 DEGREES CENTIGRADE SPECIFIC VOLUME LISTED IN THE HAND-BOOK OF CHEMISTRY AND PHYSICS, 44TH EDITION, 1963.

TABLE 1


ETHYL ETHER (ETHER)
23-2-1(4-10-1)---1
15
14
13
12
11
10
9
8
7
6
US
2
3
4
5
6
7
8
9
UP

23-2-114-10-11---2
ETHYL ETHER (ETHER)

H3-C-C(H2)-O-C(H2)-C-H3 = C4-H10-O

TO = 21-32 DEG. CENTIGRADE
VO = 1.407-1.433 CC/G

CO = 1.155 KM/SEC.
AT 20 DEG. CENTIGRADE

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC., PRESSURES IN KILOBARS, DENSITY IN G/CC AND TEMPERATURE IN DEG. CENTIGRADE.

TABLE

TO	RHOO	US	UP	P	V/VO
32	0.6978	5.40	2.550	96.1	0.528
21	0.7107	3.88	1.517	41.8	0.609

US = 1.65 + 1.47*UP KM/SEC

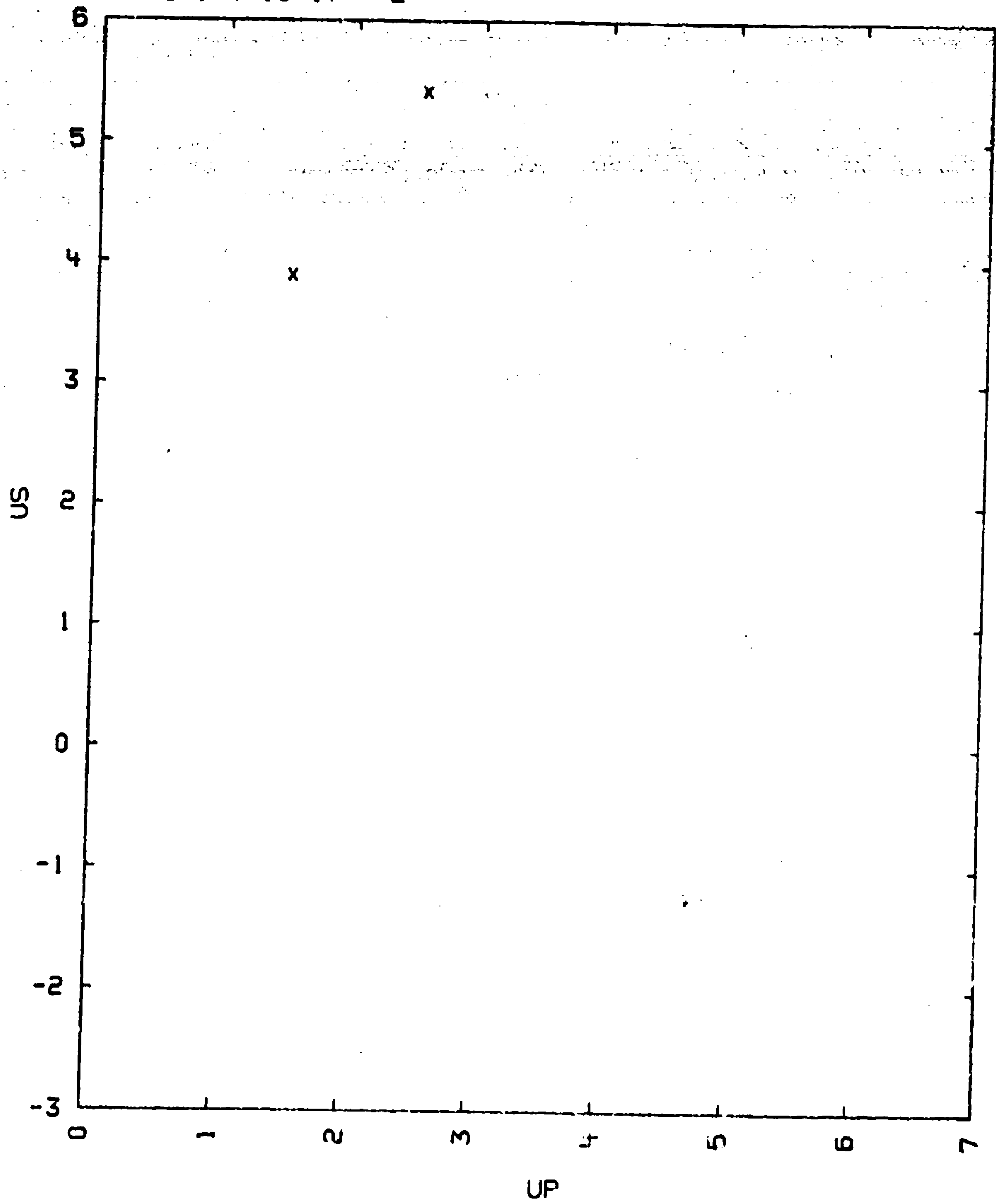
COMMENTS:

1) SOURCE: WALSH J. M. AND RICE M. H.
JOURNAL OF CHEMICAL PHYSICS, VOL. 26, P. 815 (1957)
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL 24ST ALUMINUM
3) CO WAS OBTAINED FROM L. BERGMANN, DER ULTRASCHALL (S. HIRZEL VERLAG, STUTTGART, 1954) 6TH ED., P. 376

TABLE I

ETHYL ETHER (ETHER)

23-2-1(4-10-1)---2



23-2-1(5-8-2)---0
POLYMETHYLMETHACRYLATE SUMMARY

POLYMETHYLMETHACRYLATE (H2-C-C(C-H3)-C-O2-C-H3)N = (C5-H8-O2)N

VO = 0.8474 CC/G CL = 2.72 KM/SEC CO = 2.19 KM/SEC
CS = 1.40 KM/SEC

THE TABLE LISTS PL⁻ ⁻ASS HUGONIOT POINTS CALCULATED FROM THE FITS 1A,2 AND 3A GIVEN BELOW. UNITS ARE: G/CC, KM/SEC, KBAR AND KBAR.CC/G FOR THE ENERGY DIFFERENCE. SER = SEMI ELASTIC REGION.

TABLE

FIT	RHOO	US	UP	P	V/VO	E-EO	COMMENTS
1A	1.18	3.035	.1	3.5	0.967	.050	SER
-	-	3.205	.3	11.3	0.906	.45	
-	-	3.375	.5	20.	0.852	1.25	
-	-	3.488	.633	26.	0.819	2.0	INTERSECTION
2A	-	4.055	1.0	47.8	753	5.0	
-	-	5.136	1.7	103.	669	14.4	
-	-	6.218	2.4	176.	614	28.8	
-							
3A	-	6.677	2.7	213.	0.596	36.4	
-	-	7.717	3.5	319.	0.546	61.2	
-	-	9.667	5.0	570.	0.483	125.	
-	-	12.267	7.0	1013.	0.429	245.	
-	-	14.867	9.0	1579.	0.395	405.	
-	-	17.467	11.0	2267.	0.370	605.	

US = 2.95 + .85 *UP, SIG.US = ? (FOR PLEXIGLAS)
FOR UP BETWEEN .14 AND .46 KM/SEC
US = 2.510 + 1.545*UP, SIG.US = .12 KM/SEC (FOR PLEXIGLAS)
FOR UP BETWEEN 1. AND 2.5 KM/SEC
US = 3.167 + 1.300*UP, SIG.US = .14 KM/SEC (FOR PLEXIGLAS)
FOR UP BETWEEN 2.6 AND 10.2 KM/SEC
US = 2.280 + 1.782*UP, SIG.US = .10 KM/SEC (FOR LUCITE)
FOR UP BETWEEN .8 AND 2.3 KM/SEC
US = 3.286 + 1.236*UP, SIG.US = .08 KM/SEC (FOR LUCITE)
FOR UP BETWEEN 2.5 AND 4.3 KM/SEC

COMMENTS:

1) SOURCE: COMPILER
FIT 1A FROM DATA OF 23-2-1(5-8-2)---12
- 2A AND 3A FROM DATA OF 23-2-1(5-8-2)---5 AND 10
FIT 1B AND 2B - - 23-2-1(5-8-2)---3 AND 6.

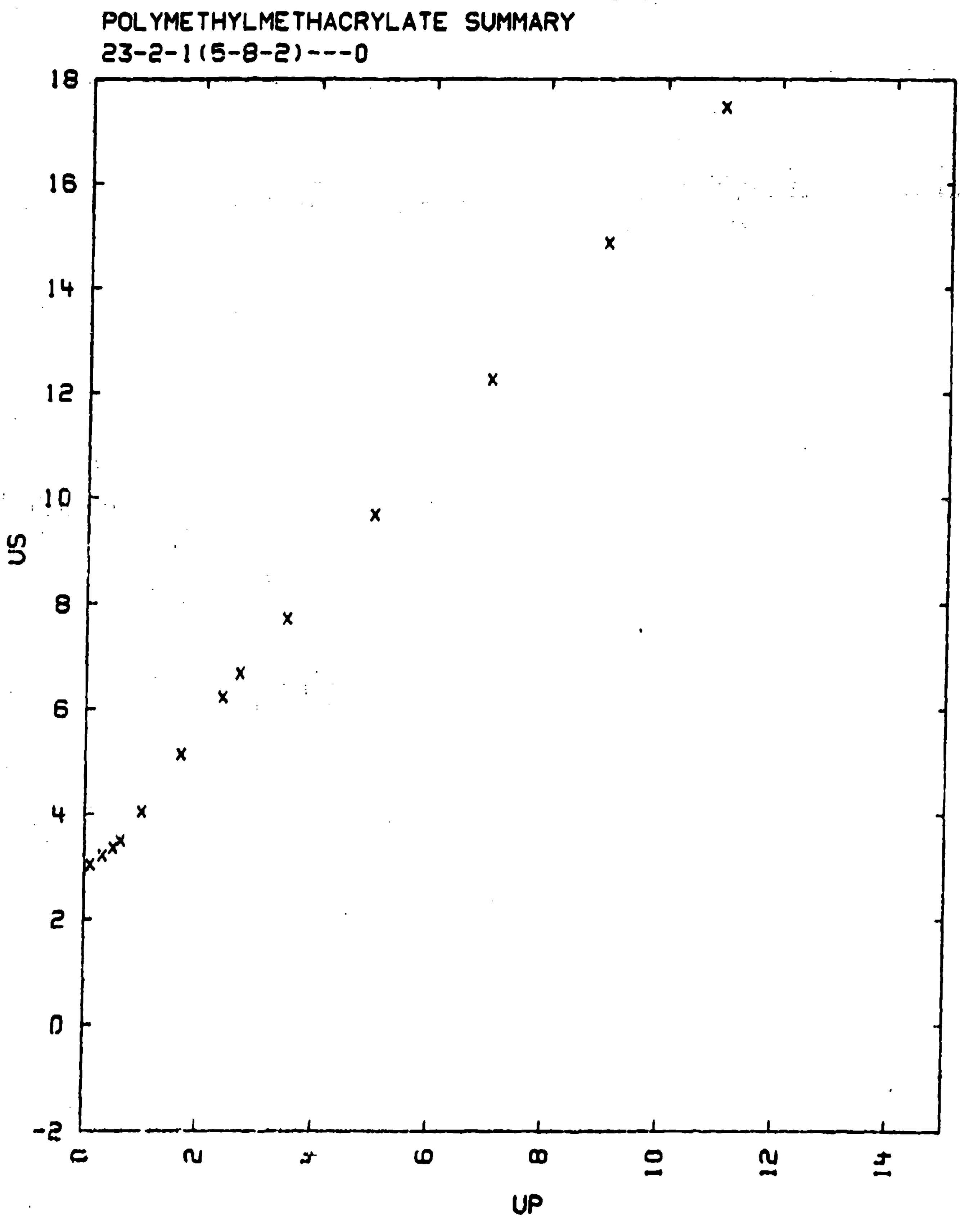
2) NO SEPERATE ELASTIC WAVE HAS BEEN DETECTED BUT FIT NO 1 EXTRAPOLATES TO A POINT CLOSE TO CL INDICATING A LACK OF PLASTIC DEFORMATION AT LOW PRESSURES. SLOW YIELDING IS INDICATED BY THE ATTENUATION IN P SHOWN BY ENTRY 23-2-1(5-8-2)---13. AS INDICATED BY ---3, THE SLOPE OF 1A OBTAINED FROM THE ASSUMPTION UFS=2UP MAY BE TOO LARGE BY 15 TO

20 PERCENT.

3) POLYMETHYLMETHACRYLATE DATA VARY SOMEWHAT MORE THAN MONOMERIC MATERIALS FROM SOURCE TO SOURCE, INDICATING A SENSITIVITY TO THE METHOD OF PREPARATION.

4) IN CONNECTION WITH COMMENT 3, THE DIFFERENCE BETWEEN FITS 2A AND 1B MAY BE THE MANUFACTURING PROCESS: FITS A ARE FOR PLEXIGLASS OF ROHM AND HAAS CO., WHILE FITS B ARE FOR DUPONT DE NEMOURS CO. LUCITE.
ALSO:
23-2-1(5-8-2)---8 DATA SHOW THE CHANGE IN DUS/DUP AT 190 KBAR CLEARLY BUT SHOW A LOWER COMPRESSIBILITY THAN THE ABOVE.
23-2-1(5-8-2)---12 AND 15 LESS COMPRESSIBLE THAN THE ABOVE FITS
23-2-1(5-8-2)---9 QUITE SOFT COMPARED TO THE AMERICAN PRODUCTS
23-2-1(5-8-2)---11 IS IN GENERAL AGREEMENT
OTHER DATA IS LESS ARE LESS ACCURATE.

TABLE I


POLYMETHYLMETHACRYLATE SUMMARY
23-2-1(5-8-2)---0
US
UP
18
16
14
12
10
8
6
4
2
0
-2
0
2
4
6
8
10
12
14

23-2-1(5-8-2)---1
PERSPEX (POLYMETHYLMETHACRYLATE)

POLYMETHYLMETHACRYLATE (H2-C-C(C-H3)-C-O2-C-H3)N = (C5-H8-O2)N

V0 = 0.847 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHO0	US	UP	P	V/V0
1.18	7.11	3.34	282	.530
-	7.62	3.20	288	.580
-	7.43	3.26	288	.563
-	8.50	4.24	425	.506
-	8.50	4.34	435	.493
-	8.61	4.37	447	.493
-	8.67	4.40	450	.491
-	12.88	7.78	1180	.396
-	13.03	7.70	1190	.409
-	13.37	7.68	1210	.426

US = 3.07 + 1.295 UP KM/SEC, SIG.US = 0.25 KM/SEC

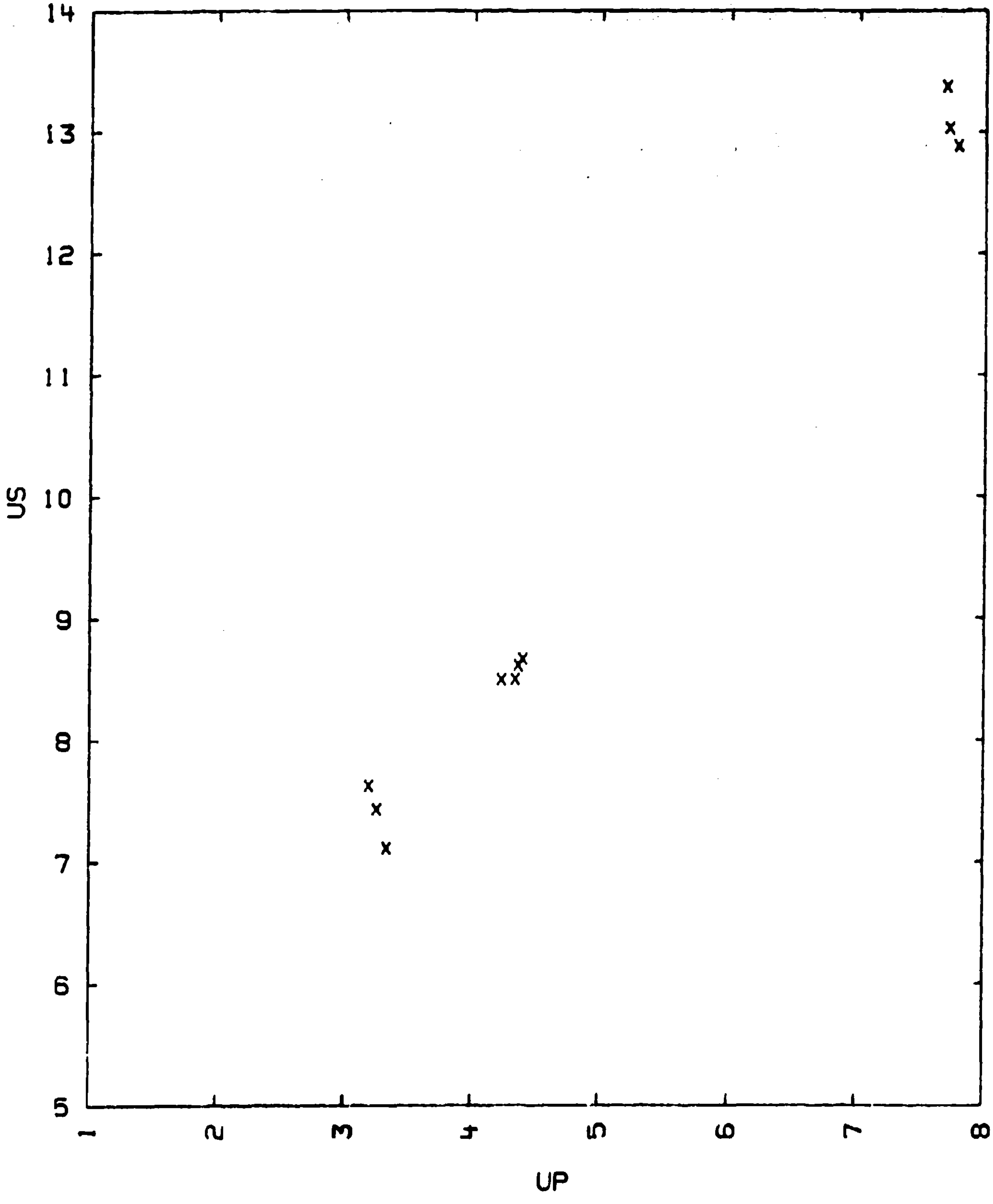
COMMENTS:

1) SOURCE: SKIDMORE, I.C. AND MORRIS, E.
THERMODYNAMICS OF NUCLEAR MATERIALS, P. 173 FF. (1962)
INTERN. AT. ENERGY AGENCY, VIENNA
ATOMIC WEAPONS RESEARCH ESTABLISHMENT, ALDERMASTON, ENGLAND
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B
THE SHOCK WAVE WAS PRODUCED BY AN EXPLOSIVELY ACCELERATED EN3 STEEL PLATE.
THE SHOCK WAS TRANSMITTED THROUGH A STEEL PLATE INTO THE SAMPLE.
3) THE VELOCITY OF THE FLYING PLATE AND THE SHOCK AND SURFACE VELOCITY OF THE TARGET PLATE WERE MEASURED AS WELL AS THE SAMPLE SURFACE AND SHOCK VELOCITIES.
4) DATA SCATTER WAS ABOUT 0.03 MICROSEC.
5) CORRECTIONS WERE MADE FOR FLYING PLATE CURVATURE OF UP TO 1 MICROSEC.
6) THE HIGHER PRESSURES WERE OBTAINED BY A SPHERICALLY CONVERGING SYSTEM.
7) ALL PELLETS WERE SURROUNDED BY LEAD TO REDUCE LATERAL RAREFACTION.

TABLE 1

PERSPEX (POLYMETHYLMETHACRYLATE)

23-2-1(5-8-2)---1



23-2-1(5-8-2)---2
PLEXIGLAS (POLYMETHYLMETHACRYLATE)

POLYMETHYLMETHACRYLATE (H2-C-C(C-H3)-C-O2-C-H3)N = (C5-H8-O2)N

V0 = .847 CC/G CL = 2.670 KM/SEC C0 = 2.42 KM/SEC
CS = 1.121 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN MM/MICROSEC, AND PRESSURE IN KILOBARS. U IS THE VELOCITY OF THE PROJECTILE PLATE.

TABLE

RHO0	US	UP	P	V/V0	U
1.18	3.23	0.150	5.69	0.9536	
-	3.22	0.210	7.88	0.9348	
-	3.92	0.665	30.7	0.8304	
-	3.93	0.900	41.6	0.7704	
-	4.35	1.20	61.3	0.6522	
-	4.39	1.34	69.4	0.6948	
1.18	3.16	0.454	16.9	0.856	0.571
-	3.26	0.590	22.7	0.819	0.745
-	3.85	0.916	41.6	0.762	1.19
-	4.17	1.17	57.6	0.720	1.54
-	4.52	1.43	76.5	0.684	1.91
-	5.97	2.28	160.	0.618	3.18

US = 3.06 + 1.04*UP KM/SEC (FIRST 6 PTS)
SIG.US = 0.1 KM/SEC
US = 2.35+1.57*UP KM/SEC (LAST 6 PTS)
SIG.US = 0.06 KM/SEC

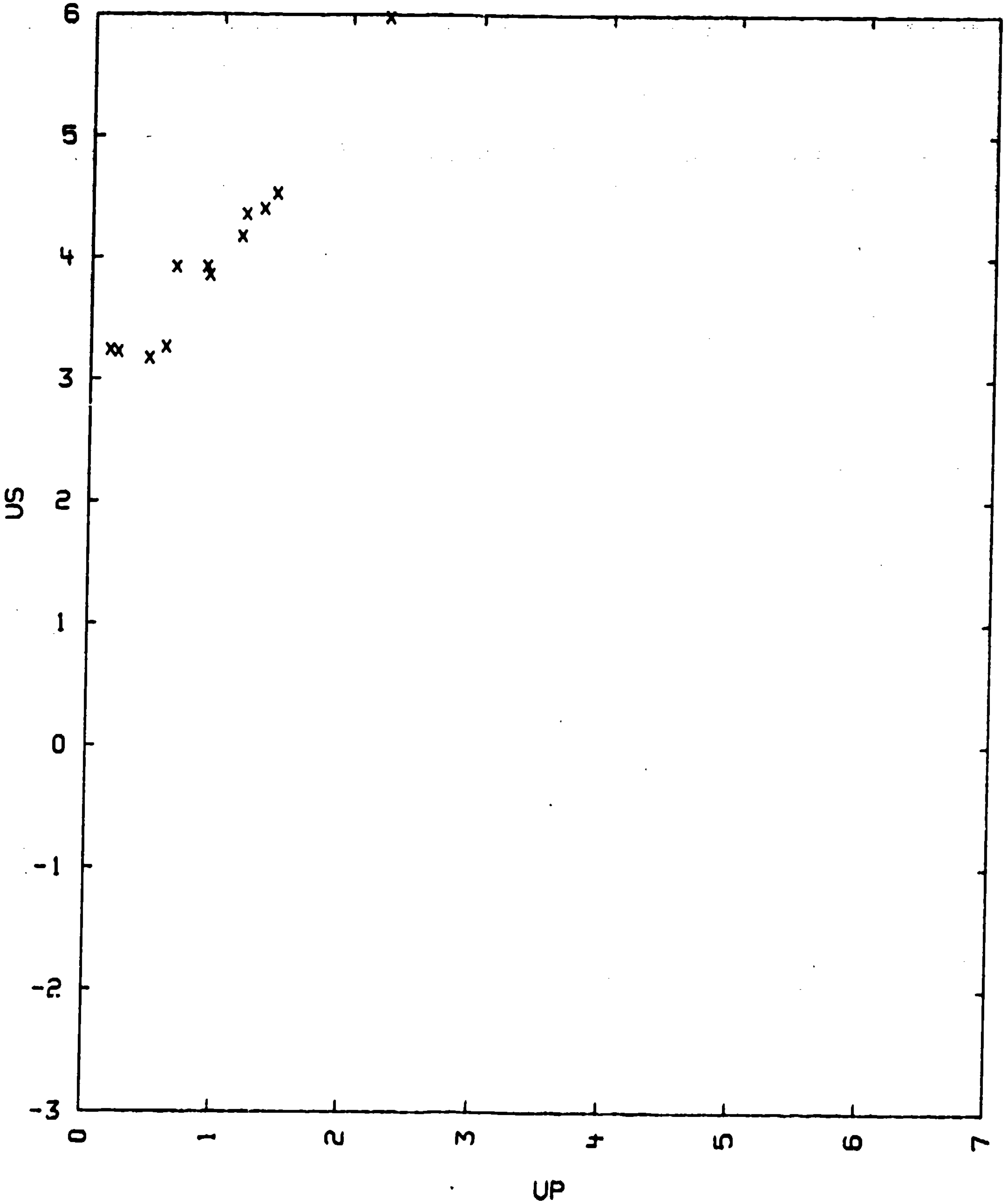
COMMENTS:

1) SOURCE: WAGNER, M.H., WALDORF, W.F. AND LOUIE, N.A.
REPORT NO. AFSWC-TDR-62-66, VOL. 1 (1962)
WORK DONE AT DOWNEY, CALIFORNIA.
2) EXPERIMENTAL TECHNIQUF A
DATA REDUCTION TECHNIQUE: D, UP=1/2*UFS FOR FIRST 6 POINTS ONLY
A, IMPACTOR MATERIAL 2024-T3 AL REST
3) ACCURACY IS LIMITED BECAUSE ASSEMBLY DIMENSIONS ALLOW RELATIVELY LARGE DEVIATIONS FROM ONE-DIMENSIONALITY.
4) CL AND CS FROM BERGMAN, L., DER ULTRASCHALL, S. HIRZEL VERLAG, STUTT-GART, P 650 (1954)
5) THE 95 PERCENT CONFIDENCE RANGE OF THE MEASURED PARAMETERS IN THE LAST SET OF 6 POINTS IN THE ORDER OF THE LISTING IS GIVEN BY:
+ OR - FDEL US = 11. 6.4 8.0 5.5 6.9 10.5 PERCENT
+ OR - FDEL U = 1.8 2.1 2.9 5.0 2.1 7.1 -
HERE FDEL U = 100(DEL U)/U

TABLE I

PLEXIGLAS (POLYMETHYLMETHACRYLATE)

23-2-1(5-8-2)---2



23-2-1(5-8-2)---3
LUCITE (POLYMETHYLMETHACRYLATE)

POLYMETHYLMETHACRYLATE (H2-C-C(C-H3)-C-O2-C-H3)N = (C5-H8 O2)N

V0 = 0.845 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

SAMPLE						AL BASE PLATE
RHO0	US	UFS	UP	P	V/V0	PRESSURE
1.182	8.55	8.15	4.19	422	0.510	796
1.184	7.84	7.25	3.76	348	0.520	670
1.183	5.31	3.21	1.75	110	0.670	231
1.183	6.43	5.12	2.52	192	0.608	381
1.184	7.35	6.04	3.30	287	0.551	553
1.184	8.50		4.23	426	0.502	804
1.186	5.83	3.94	1.99	138	0.659	277
1.184	4.45	2.24	1.21	64	0.728	143
1.183	3.66	1.42	0.88	38	0.761	94
1.186	5.00	2.907	1.615	96	0.6770	207
1.187	4.504		1.387	74	0.6921	168

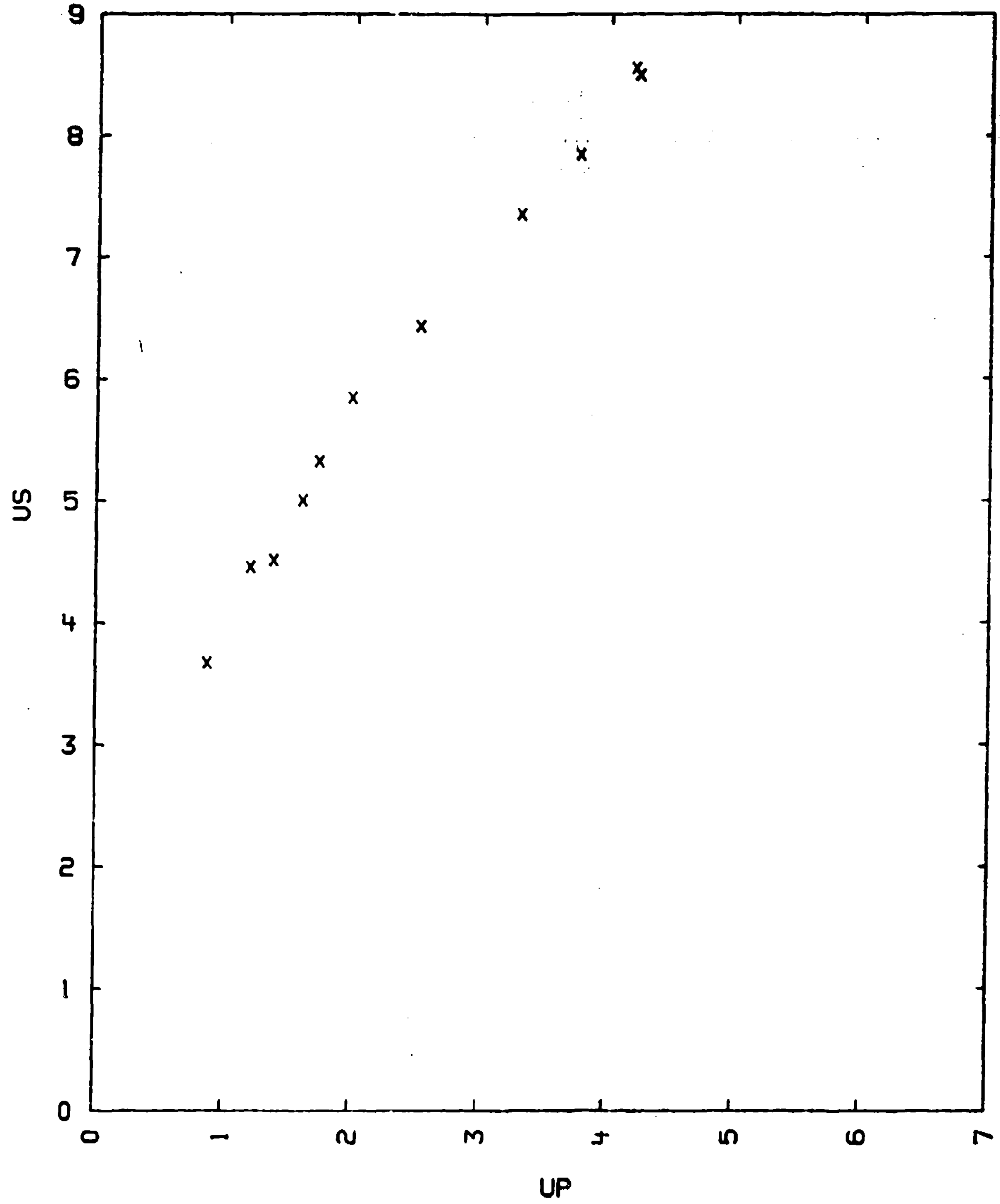
US = 2.80 + 1.37 UP KM/SEC
SIGMA US = 0.199 KM/SEC

COMMENTS:

1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) THE OBSERVATION IN THE TABLE THAT UP TENDS TO BE LESS THAN 1/2UFS SUGGESTS THAT PART OF THE SHOCK COMPRESSION IS IRREVERSIBLE ON THE TIME SCALE OF THE EXPERIMENT

TABLE I

LUCITE (POLYMETHYLMETHACRYLATE)
23-2-1(5-8-2)---3



23-2-1(5-8-2)---4
PERSPEX (POLYMETHYLMETHACRYLATE)

POLYMETHYLMETHACRYLATE (H2-C-C(C-H3)-C-O2-C-H3)N = (C5-H8-O2)N

V0 = 0.83 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, PRESSURE IN KILOBARS AND SAMPLE THICKNESS, D, IN MM.

TABLE

RHO0	US	UP	UFS	P	V/V0	D
1.2	5.37	2.2	4.3	141.	0.59	3.22
-	5.29	1.8	3.6	114.	0.66	6.16
-	5.12	1.64	3.28	101.	0.680	12.42
-	4.81	1.59	3.18	92.	0.670	24.88
-	4.54	1.43	2.87	78.	0.685	37.5
-	4.30	1.12	2.24	57.8	0.740	49.6
-	4.08	0.95	1.89	46.5	0.767	62.3
-	3.88	0.70	1.40	32.6	0.820	74.4

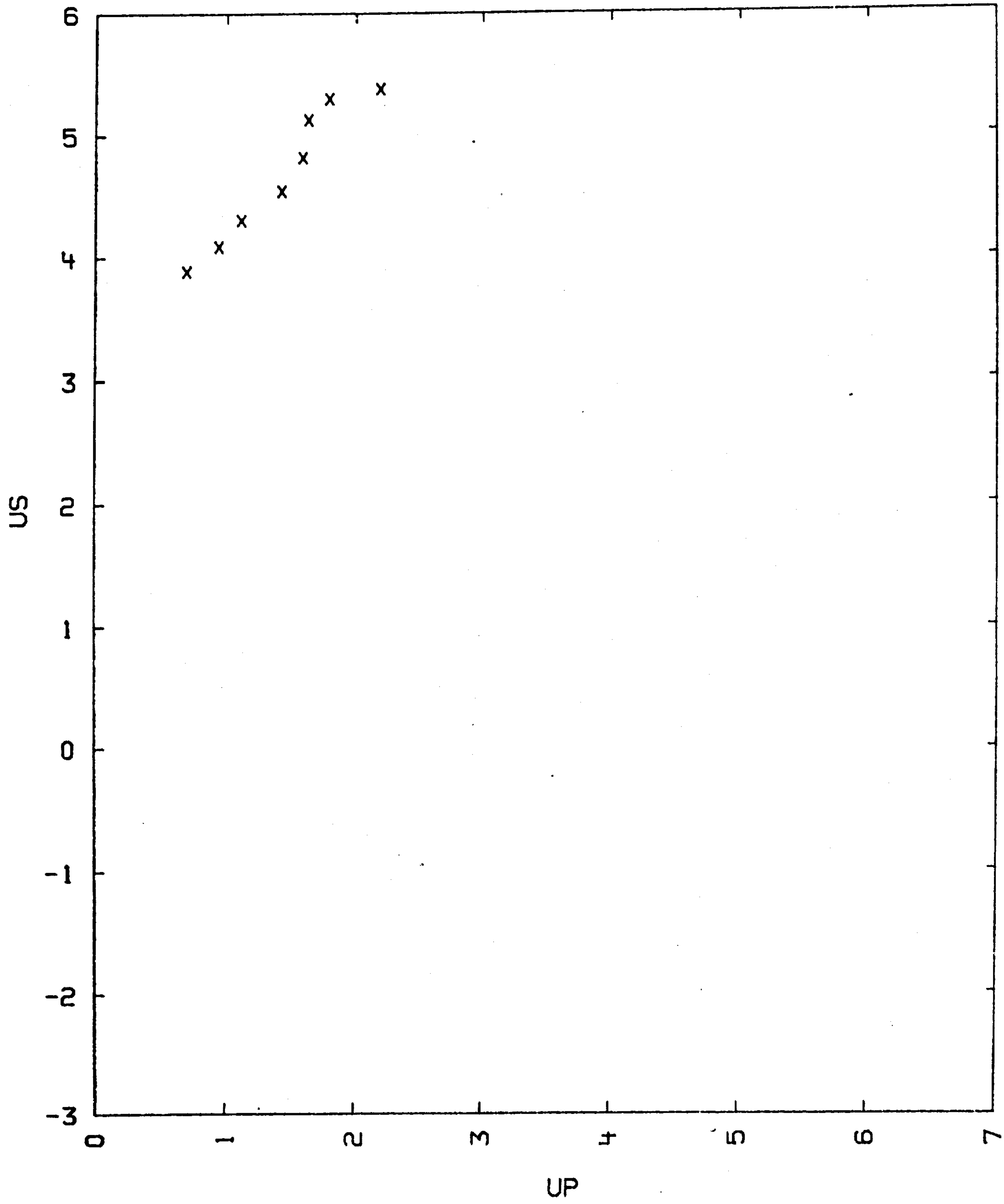
US = 3.07 + 1.12 UP KM/SEC
SIGMA US = 0.15 KM/SEC

COMMENTS

1) SOURCE: BUCHANAN, J. S., JAMES, H. J. AND TEAGUE, G. W.
PHIL. MAG., VOL. 3, P. 1432, (1958)
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE D
3) NOTE FURTHER THAT THE SHOCK VELOCITIES WERE OBTAINED BY FIRST FITTING TIME-POSITION DATA FOR THE SHOCK IN LUCITE, GIVING:
US = 1/(0.183 + 0.001*D) KM/SEC., WHERE D IS IN MM
THIS PRESMOOTHING OF THE US DATA REDUCED SIGMA US SLIGHTLY.
4) DEVIATIONS FROM ONE DIMENSIONALITY IN THESE EXPERIMENTS ARE RELATIVELY LARGE DUE TO THE SMALL EXPLOSIVE CHARGE USED: 7.5 CM.

TABLE I

PERSPEX (POLYMETHYLMETHACRYLATE)
23-2-1(5-8-2)---4



23-2-1(5-8-2)---5
PLEXIGLAS (POLYMETHYLMETHACRYLATE)

POLYMETHYLMETHACRYLATE (H2-C-C(C-H3)-C-02-C-H3)N = (C5-H8-02)N

V0 = 0.8474 CC/G   CL = 2.718 KM/SEC   C0 = 2.188 KM/SEC
                          CS = 1.396 KM/SEC

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITY IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

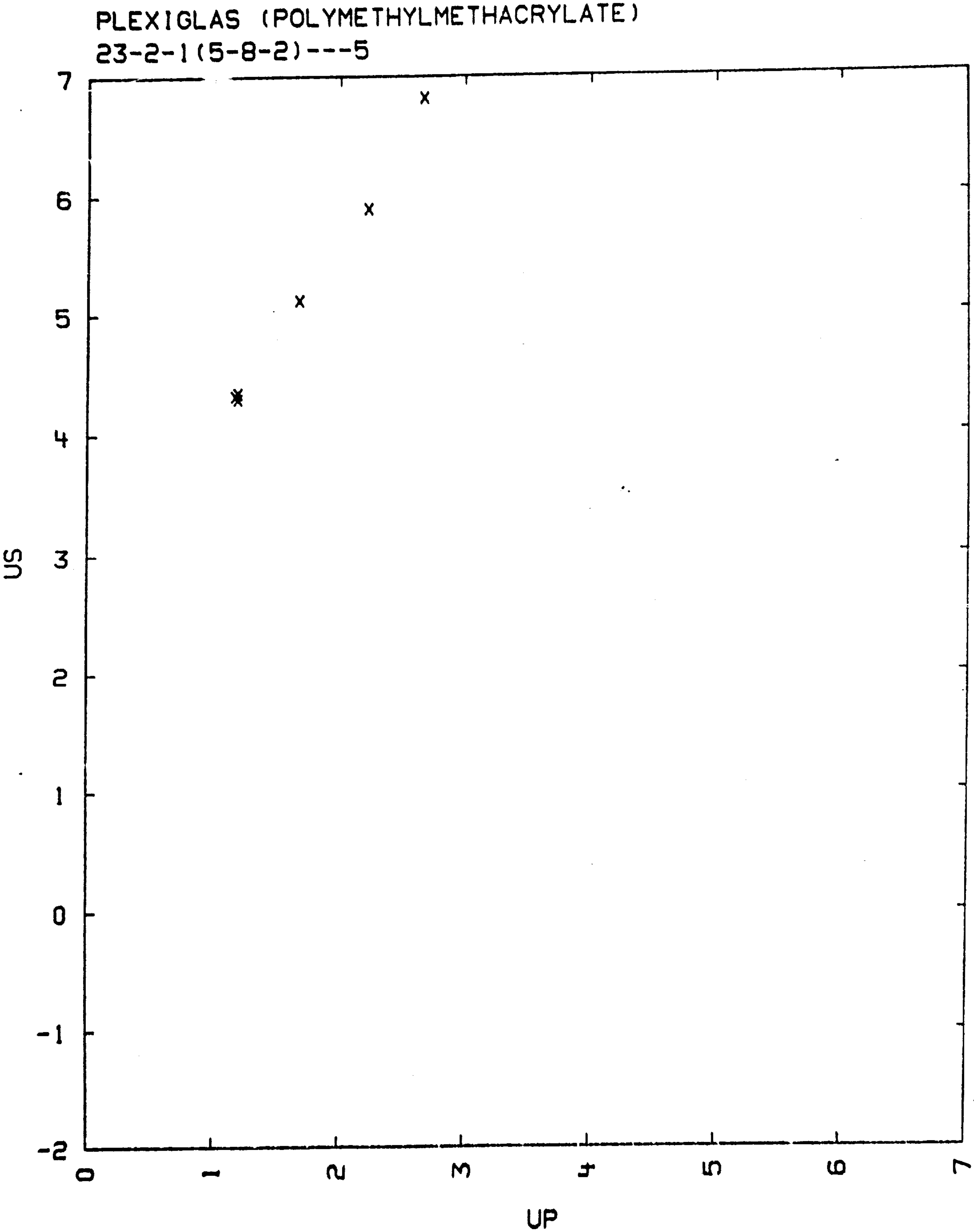
RHO0	US	UFS	UP	P	V/V0
1.180	5.884		2.223	154.3	0.6222
-	5.110		1.682	101.4	0.6708
-	5.102		1.674	100.8	0.6719
-	4.312		1.181	60.1	0.7261
-	4.290		1.200	60.8	0.7203
1.182	4.336		1.198	61.4	0.7237
1.181	6.816	5.395	2.668	214.8	0.6086

US = 2.334 + 1.650 UP   KM/SEC
SIGMA US = 0.067   KM/SEC

COMMENTS:

1) SOURCE: DEAL, W. E.
   PRIVATE COMMUNICATION
   WALSH, J. M., YARGER, F. L., AND MCQUEEN, R. G.
   GMX-6 REPORTS 1954, 1955.
   GMX-6, LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO
2) EXPERIMENTAL TECHNIQUE B
   DATA REDUCTION TECHNIQUE B. STANDARD MATERIAL 2027 AL
3) ONLY THE LAST VALUE OF UP WAS OBTAINED BY SUBTRACTING FROM .5*UFS THE EXTRAPOLATED QUANTITY 1/2(UFS-2UP) GIVEN BY THE MATERIAL
4) THE ABOVE SOUND VELOCITIES WERE OBTAINED ON A PLEXIGLAS TYPE G UNSHRUNK SHEET WITH RHO = 1.187 G/CC AT T = 23 DEGREES CENTIGRADE
   ALSO MEASURED BY DEAL AND MARSH:
   PLEXIGLAS TYPE II, UVT SHEETS, RHO = 1.185 G/CC, T = 23 DEGREES CENTIGRADE
   CL = 2.715, CS = 1.395, C0 = 2.186 KM/SEC
   EVR-KLEER   RHO = 1.184 G/CC   T = 23 DEGREES
   CL = 2.691, CS = 1.376, C0 = 2.172 KM/SEC
   BY RAMSAY, GMX-8, ABOVE ADDRESS
   EVR-KLEER
   CL = 2.713, CS = 1.367, C0 = 2.206 KM/SEC
   'OLD' EVR-KLEER
   CL = 2.706, CS = 1.407, C0 = 2.163 KM/SEC

TABLE I


PLEXIGLAS (POLYMETHYLMETHACRYLATE)
23-2-1(5-8-2)---5
US
UP
7
6
5
4
3
2
1
0
-1
-2
0
1
2
3
4
5
6
7

23-2-1(5-8-2)---6
LUCITE (POLYMETHYLMETHACRYLATE)

POLYMETHYLMETHACRYLATE (H2-C-C(C-H3)-C-02-C-H3)N = (C5-H8-02)N

V0 = 0.8474 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITY IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

RHO0	US	UP	UFS	P	V/V0
1.180	6.257	2.244	4.522	165.7	0.6414
-	6.078	2.153		154.4	0.6458
-	5.263	1.689	3.396	104.9	0.6791
-	4.705	1.310	2.592	72.7	0.7216
-	4.695	1.310	2.609	72.6	0.7210
-	4.719	1.299	2.580	72.3	0.7247
-	5.409	1.722		109.9	0.6816

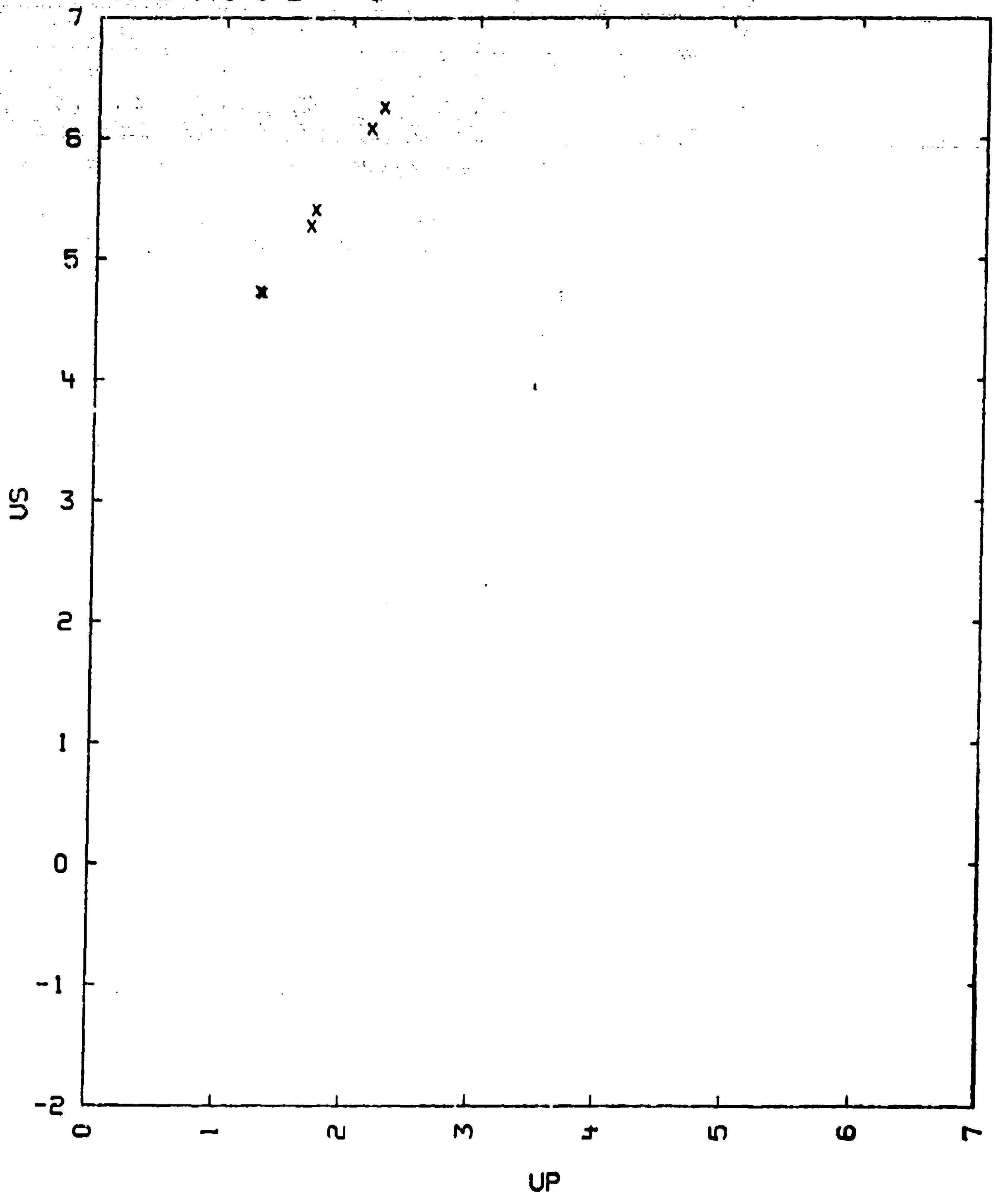
US = 2.556 + 1.637 UP KM/SEC
SIGMA US= 0.037 KM/SEC

COMMENTS:

1) SOURCE: DEAL, W. E.
PRIVATE COMMUNICATION
GMX.6, LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO.
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B. STANDARD MATERIAL 2024 AL
3) THE LAST POINT HAS BEEN REPORTED BEFORE BY:
WALSH, J. M., YARGER, F. L., AND MCQUEEN, R. G.
GMX-6 REPORTS 1954, 1955.

TABLE I

LUCITE (POLYMETHYLMETHACRYLATE)
23-2-1(5-8-2)---6



23-2-1(5-8-2)---7
PLEXIGLAS (POLYMETHYLMETHACRYLATE)

POLYMETHYLMETHACRYLATE (H2-C-C(C-H3)-C-O2-C-H3)N = (C5-H8-O2)N

V0 = 0.847 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITY IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

RHO0	US	UP	P	V/V0
1.18	2.900	0.073	2.5	0.975
-	2.940	0.077	2.7	0.974
-	2.980	0.086	3.0	0.971
-	3.025	0.098	3.5	0.967
-	3.070	0.125	4.5	0.959
-	3.101	0.150	5.5	0.952
-	3.130	0.176	6.5	0.944
-	3.157	0.202	7.5	0.936
-	3.183	0.228	8.5	0.928
-	3.080	0.176	6.5	0.943
-	3.097	0.189	7.0	0.939
-	3.121	0.215	8.0	0.931
-	3.143	0.240	9.0	0.923
-	3.177	0.291	11.0	0.908
-	3.204	0.343	13.0	0.893
-	3.228	0.394	15.0	0.878
-	3.250	0.446	17.0	0.863
-	3.270	0.488	19.0	0.851

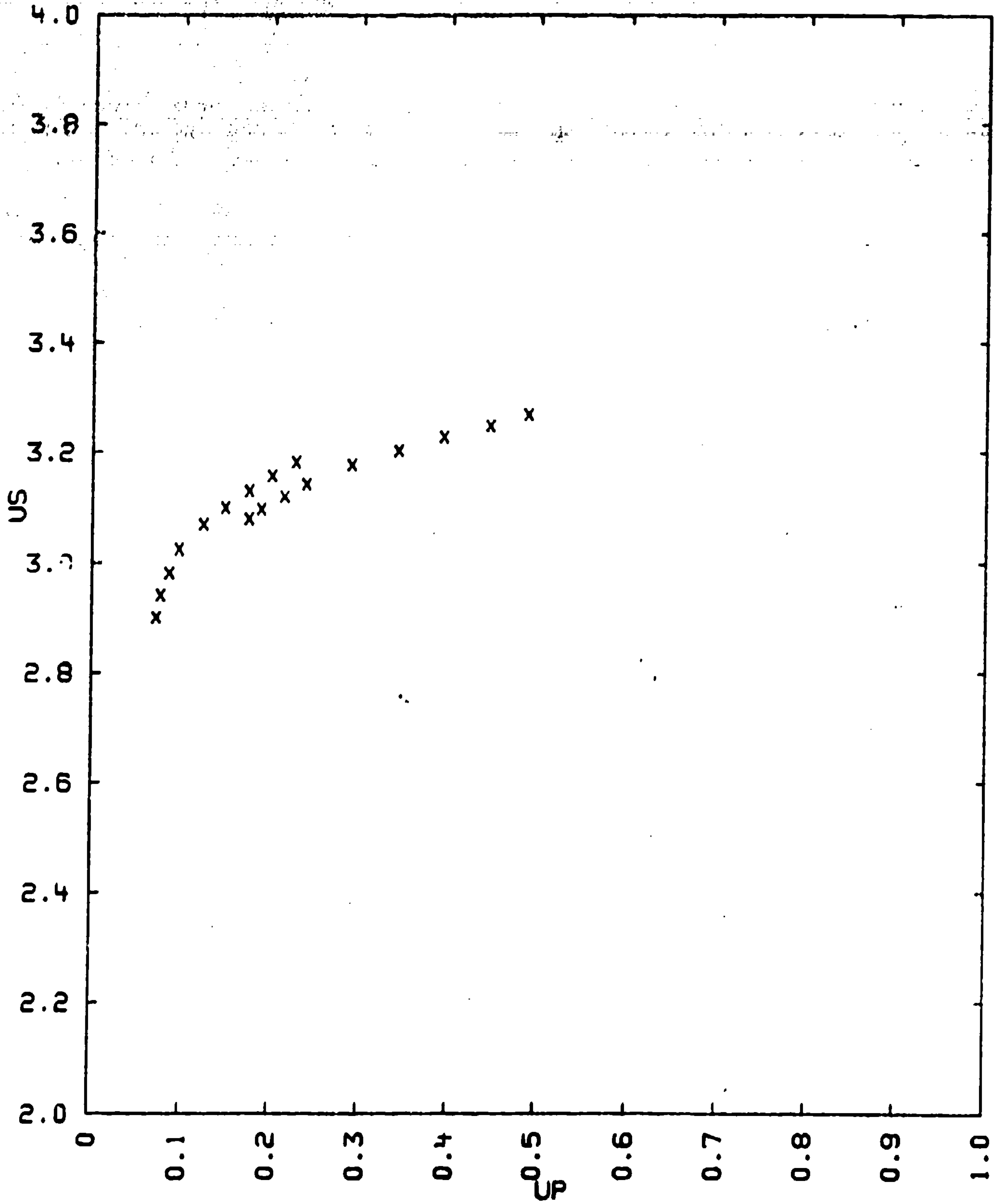
US = NO SIMPLE POLYMONIAL ADEQUATELY REPRESENTS THIS DATA

COMMENTS

1) SOURCE: SCHMIDT, D. N. AND EVANS, M. W.
PREPRINT
STANFORD RES. INST., PALO ALTO, CALIFORNIA.
2) EXPERIMENTAL TECHNIQUE D
DATA REDUCTION TECHNIQUE NOT SUMMARISED.
A RELATIVELY ELABORATE CORRECTION MUST BE APPLIED TO THE OBSERVATIONS IN THESE TWO EXPERIMENTS SINCE THE WAVE HAS A DISTINCT TWO DIMENSIO-NAL CHARACTER AND IMPACTS THE SAMPLE SURFACE AT AN ANGLE.
SEE: FOWLES, G. R., J. APPL. PHYS., VOL. 32, P. 1475, (1961)
3) THE DATA SHOW A STRONGLY CURVING US VS. UP LOCUS.

TABLE I

PLEXIGLAS (POLYMETHYLMETHACRYLATE)
23-2-1(5-8-2)---7



23-2-1(5-8-2)---8
PLEXIGLAS (POLYMETHYLMETHACRYLATE)

POLYMETHYLMETHACRYLATE H2-C-C(C-H3)-C(0)-0-CH3 N = C5-H8-02

V0 = 0.847 CC/G

IN THE TABLE BELOW DENSITY IS GIVEN IN G/CC, VELOSITY IN KM/SEC, AND PRESSURE IN KILOBARS

TABLE

RHO0	US	UP	P	V/V0
1.18	4.07	0.89	42.7	0.781
-	4.58	1.17	63.2	0.744
-	4.60	1.15	62.4	0.750
-	5.45	1.75	112.5	0.678
-	5.47	1.80	116.2	0.671
-	5.52	1.71	111.4	0.690
-	6.05	2.08	148	0.656
-	6.07	2.11	151	0.652
-	6.08	2.03	146	0.667
-	6.08	2.16	155	0.644
-	6.09	2.20	158	0.638
-	6.15	2.10	152	0.658
-	6.16	2.12	154	0.656
-	6.46	2.34	178	0.637
-	6.48	2.38	182	0.632
-	6.78	2.48	198	0.634
-	6.88	2.72	221	0.604
-	6.93	2.65	217	0.617
-	7.13	2.88	242	0.596
-	7.33	3.08	266	0.579
-	7.50	3.19	282	0.575
-	7.54	3.24	288	0.570
-	7.57	3.33	297	0.560
-	7.58	3.28	293	0.568
-	7.62	3.28	295	0.570
-	7.62	3.32	298	0.564
-	7.62	3.35	301	0.560
-	7.64	3.28	296	0.571
-	7.66	3.25	294	0.576
-	7.67	3.36	304	0.562

US = 2.68 + 1.61 UP KM/SEC FROM UP = 0.8 TO 2.6 KM/SEC
SIGMA US = 0.08 KM/SEC
US = 3.51 + 1.25 UP KM/SEC FROM UP = 2.8 TO 3.5 KM/SEC
SIGMA US = 0.05 KM/SEC

COMMENTS:

1) SOURCE: HAUVER, G.E. AND MELANI, A.
B.R.L REPORT NO. 1259 (1964)
BALLISTIC RES. LABS., ABERDEEN PROVING GROUNDS
MARYLAND

2) EXPERIMENTAL TECHNIQUE H
DATA REDUCTION METHOD B

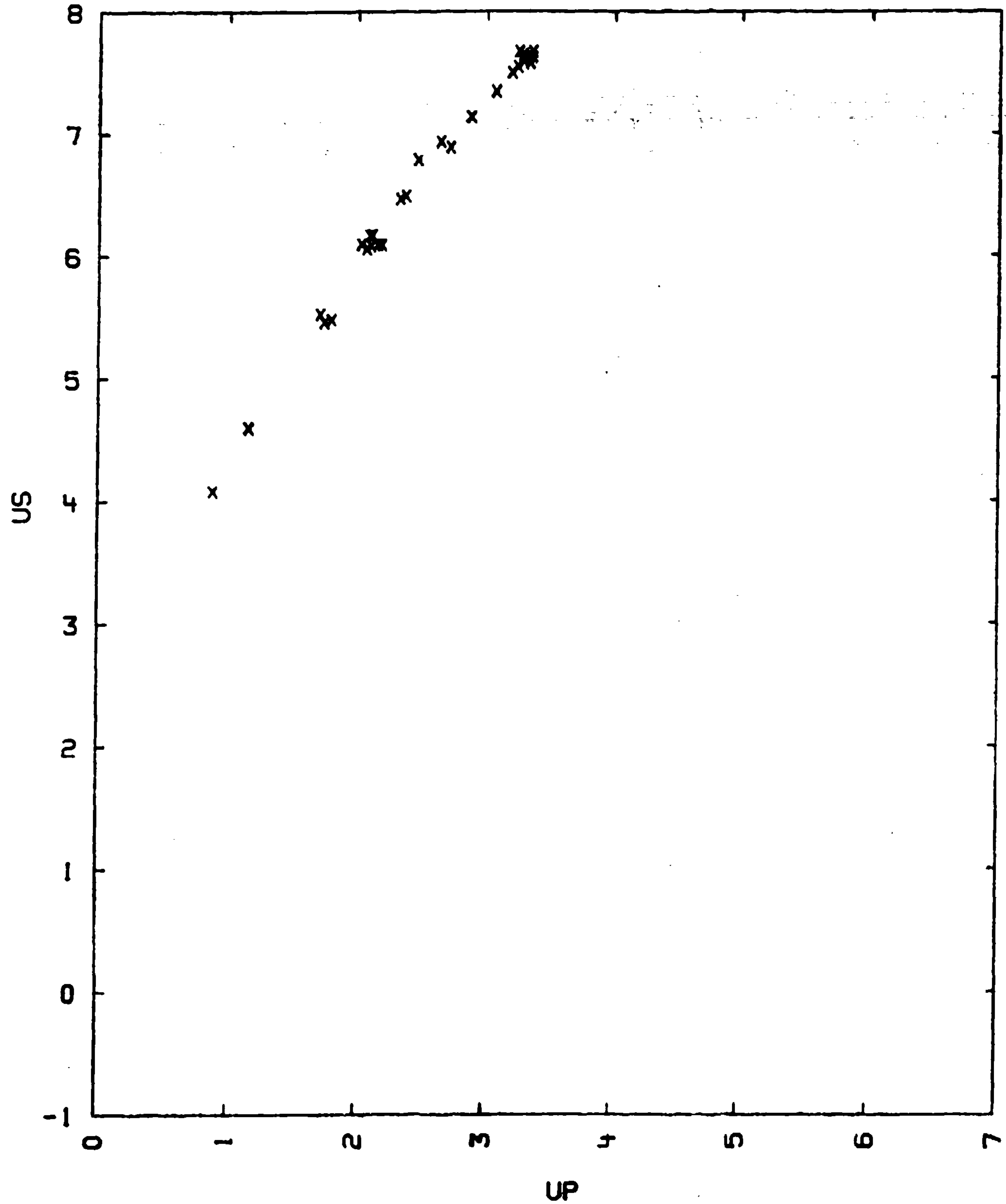
3) THE ABOVE DATA SUGGEST A TRANSITION AT 200 KB WHICH IS SUPPORTED BY A RAPID CHANGE IN THE POLARIZATION SIGNAL ABOVE THIS PRESSURE

4) ALL POINTS WERE CORRECTED FOR SHOCK WAVE TILT

TABLE I

PLEXIGLAS (POLYMETHYLMETHACRYLATE)

23-2-1(5-8-2)---8



23-2-1(5-8-2)---9
PLEXIGLAS (POLYMETHYLMETHACRYLATE)

POLYMETHYLMETHACRYLATE (H2-C-C(C-H3)-C-O2-C-H3)N = (C5-H8-O2)N

MANUFACTURED BY ROHM AND HAAS GMBH, DARMSTADT, GERMANY.

VO = 0.840 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UP	P	V/VO
1.19	4.17	1.31	65	0.686
-	4.56	1.53	83	0.665
-	5.28	2.05	128	0.611
-	5.81	2.41	167	0.584
-	5.78	2.44	168	0.577
-	6.59	2.77	218	0.579

US = 2.12 + 1.56 UP KM/SEC
SIGMA US = 0.116 KM/SEC

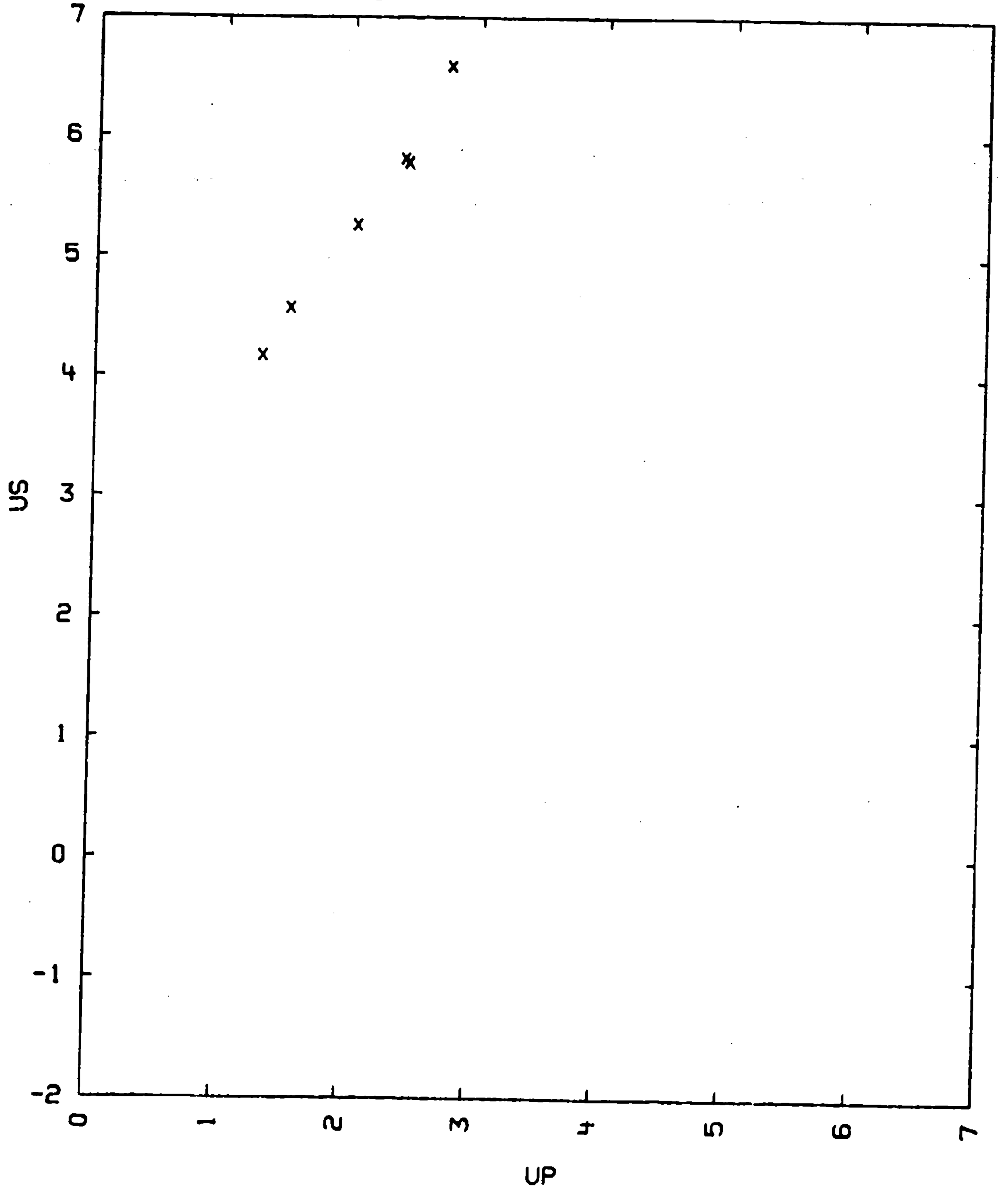
COMMENTS:

1) SOURCE: LUNDBERG, LENNART.
PRIVATE COMMUNICATION
RESEARCH INSTITUTE OF NATIONAL DEFENCE, STOCKHOLM, SWEDEN.
2) EXPERIMENTAL TECHNIQUE B.
DATA REDUCTION TECHNIQUE B.

TABLE I

PLEXIGLAS (POLYMETHYLMETHACRYLATE)

23-2-1(5-8-2)---9



23-2-1(5-8-2)---10
PLEXIGLAS (POLYMETHYLMETHACRYLATE)

POLYMETHYLMETHACRYLATE (H2-C-C(C-H3)-C-02-C-H3)N = (C5-H8-02)N

V0 = 0.847 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS.

TABLE

SAMPLE					BASE PLATE	
RHOO	US	UP	P	V/VO	MATERIAL	UP
1.18	4.24	1.04	52	0.734	AL	0.69
-	5.96	2.29	161	0.616	AL	1.60
-	6.42	2.44	185	0.620	AL	1.74
-	6.60	2.73	213	0.586	PLEXIGLAS	2.73
-	8.02	3.76	356	0.531	AL	2.77
-	8.96	4.52	477	0.495	PLEXIGLAS	5.62
-	9.72	4.97	570	0.488	AL	3.70
-	9.89	5.16	602	0.478	PLEXIGLAS	6.46
-	10.31	5.45	663	0.471	PLEXIGLAS	6.85
-	10.45	5.70	703	0.455	PLEXIGLAS	7.16
-	10.68	5.75	724	0.461	PLEXIGLAS	7.24
-	12.52	7.18	1060	0.427	PLEXIGLAS	9.10

US = 2.96 + 1.34*UP KM/SEC
SIGMA US = 0.098 KM/SEC

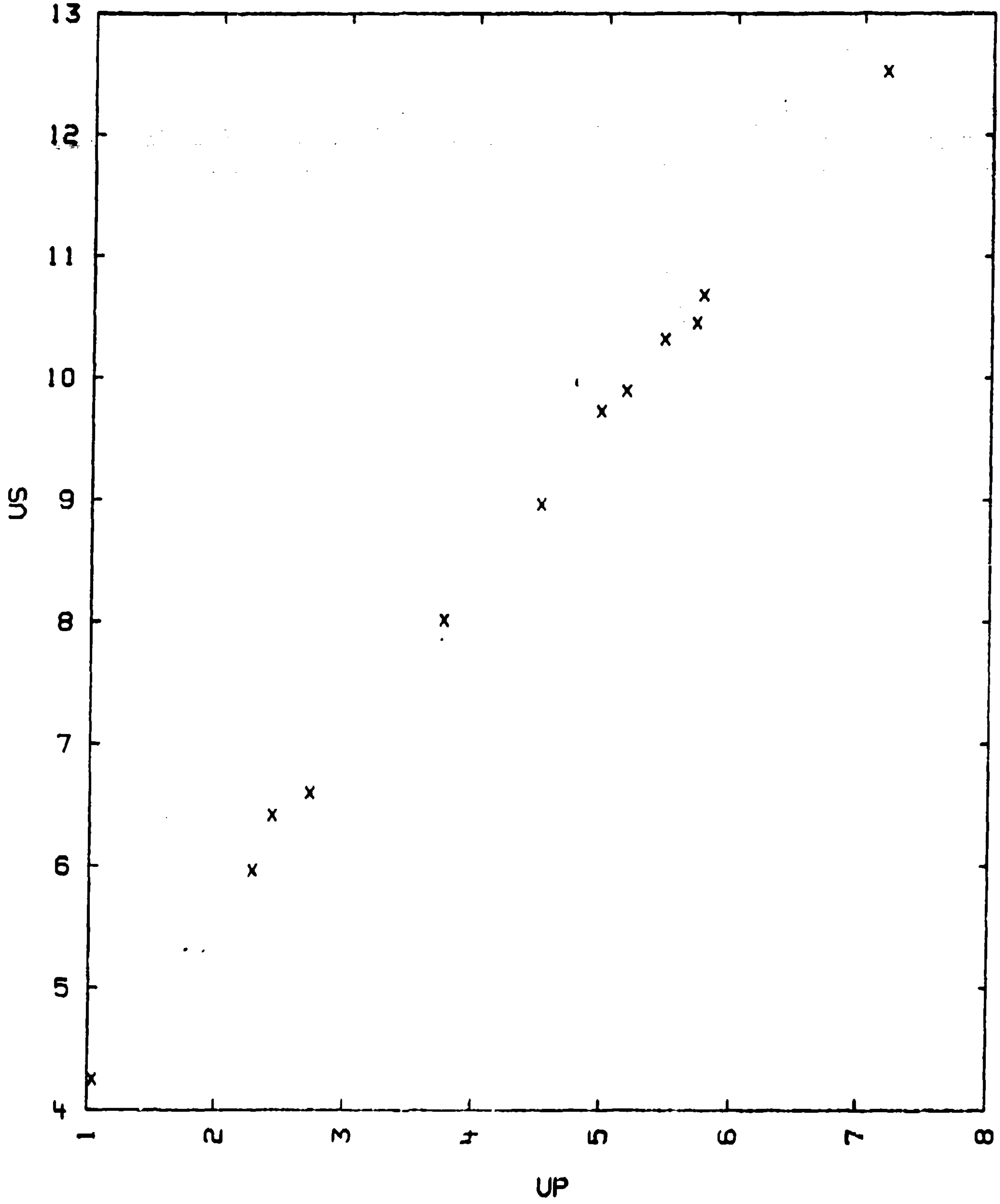
COMMENTS:

1) SOURCE: BAKANOVA, A.A., DUDOLADOV, I.P. AND TRUNIN, R.F.
FIZIKA TVERDOGO TELA, VOL. 7, NO. 6, PP. 1616 - 1622 (1965)
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B.
3) THE FOLLOWING HUGONIOT RALATIONSHIPS FOR THE AL BASE PLATE WERE USED:
US = 5.25 + 1.39 UP KM/SEC
RHOO = 2.71 G/CC
4) THE ABOVE LINEAR US UP RELATIONSHIP SEEMS TO BREAK UP BELOW 4.50 KM/SEC. BETWEEN UP = 2.0 AND 8.0 KM/SEC THIS SOURCE GIVES A FIT : US = 3.10 + 1.32*UP KM/SEC .
5) A SINGLE POINT US = 16.5 UP = 10.2 P = 2000 V/V0 = 0.382
WAS REPORTED BY: ZELDOVICH ET AL
DOKLADY AKAD. NAUK SSSR(PHYS), VOL. 122, P.48 (1958)
OR
SOVIET PHYS., DOKLADY, VOL. 3, P. 905, (1958)

TABLE I

PLEXIGLAS (POLYMETHYLMETHACRYLATE)

23-2-1(5-8-2)---10



23-2-1(5-8-2)---11
PLEXIGLAS (POLYMETHYLMETHACRYLATE)

POLYMETHYLMETHACRYLATE (H2-C-C(C-H3)-C(O)-O-C-H3)N = (C5-H8-O2)N 95 PERCENT
M33 PLASTIFIER 5 PERCENT

V0 = 0.840 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC. PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

SAMPLE						STANDARD
RHOO	US	UFS	UP	P	V/V0	UFS
1.19	6.305	4.682	2.265	170	0.641	
-	6.305	4.744	2.290	172	0.637	
-	6.203	4.613	2.230	164.5	0.640	
-	6.289	4.409	2.140	160	0.660	
-	6.097	4.244	2.060	149.5	0.662	
-	6.068	4.394	2.135	154	0.648	
-	6.045	4.166	2.020	146.5	0.666	
-	6.105	4.251	2.060	148	0.669	
-	5.938		2.052	145	0.654	2.890
-	5.708		2.037	138.5	0.643	2.840
-	6.017	4.160	2.020	144.5	0.664	
-	6.017	4.150	1.995	143	0.668	
-	5.767		2.083	143	0.639	2.910
-	5.980		2.002	142.5	0.665	2.820
-	5.555		1.970	130	0.645	2.720
-	5.695		1.948	132	0.658	2.720
-	5.675		1.940	131	0.658	2.710
-	5.675		1.881	127	0.669	2.640
-	5.470		1.874	122	0.657	2.600
-	5.543		1.850	122	0.666	2.570
-	5.580		1.814	120.5	0.675	2.525
-	5.562		1.828	121	0.671	2.545
-	5.359		1.756	112	0.672	2.420
-	5.537		1.723	113.5	0.689	2.400
-	5.252		1.800	112	0.657	2.475
-	5.336		1.771	112.5	0.668	2.445
-	5.219		1.768	107	0.661	2.400
-	5.279		1.780	109	0.663	2.440
-	5.241		1.627	101.5	0.690	2.240
-	5.219		1.642	102	0.685	2.260
-	5.123		1.591	97	0.689	2.180
-	5.068		1.592	96	0.686	2.175
-	5.070		1.558	94	0.693	2.120
-	5.070		1.566	95.5	0.691	2.130
-	5.030		1.538	92	0.695	2.095
-	4.975		1.571	93	0.684	2.145
-	4.845		1.397	80.5	0.712	1.890
-	4.757		1.413	80	0.703	1.910
-	4.821		1.386	79.5	0.713	1.870

PLEXIGLAS (POLYMETHYLMETHACRYLATE)

RHO0	US	UFS	UP	P	V/V0	UFS
-	4.734		1.402	79	0.704	1.880
-	4.062		1.076	52	0.735	1.400
-	4.175		1.107	55	0.735	1.450
-	4.102		1.045	51	0.745	1.370
-	4.128		1.099	54	0.734	1.450
-	4.028		1.115	54	0.726	1.470
-	4.068		1.053	51	0.741	1.370
-	4.055		1.015	49	0.750	1.320
-	4.146		1.034	51	0.751	1.340
-	4.022		1.046	50	0.740	1.350
-	4.071		1.043	50.5	0.744	1.370
-	4.081		0.988	48	0.758	1.290
-	4.156		0.991	49	0.762	1.300
-	4.102		0.993	48	0.760	1.290
-	4.088		0.977	47.5	0.761	1.280
-	3.987		1.000	47.5	0.749	1.300
-	3.987		1.012	48	0.746	1.305
-	4.125		0.958	47	0.768	1.260
-	4.092		0.956	46.5	0.766	1.257
-	3.955		0.935	44	0.764	1.210
-	3.897		0.917	42.5	0.765	1.190
-	3.882		0.937	43	0.759	1.200
-	3.903		0.930	43.5	0.760	1.220
-	3.793		0.880	40	0.768	1.130
-	3.770		0.858	38.5	0.772	1.110

US = 2.239 + 1.798 UP KM/SEC, SIG.US = 0.11 KM/SEC

COMMENTS:

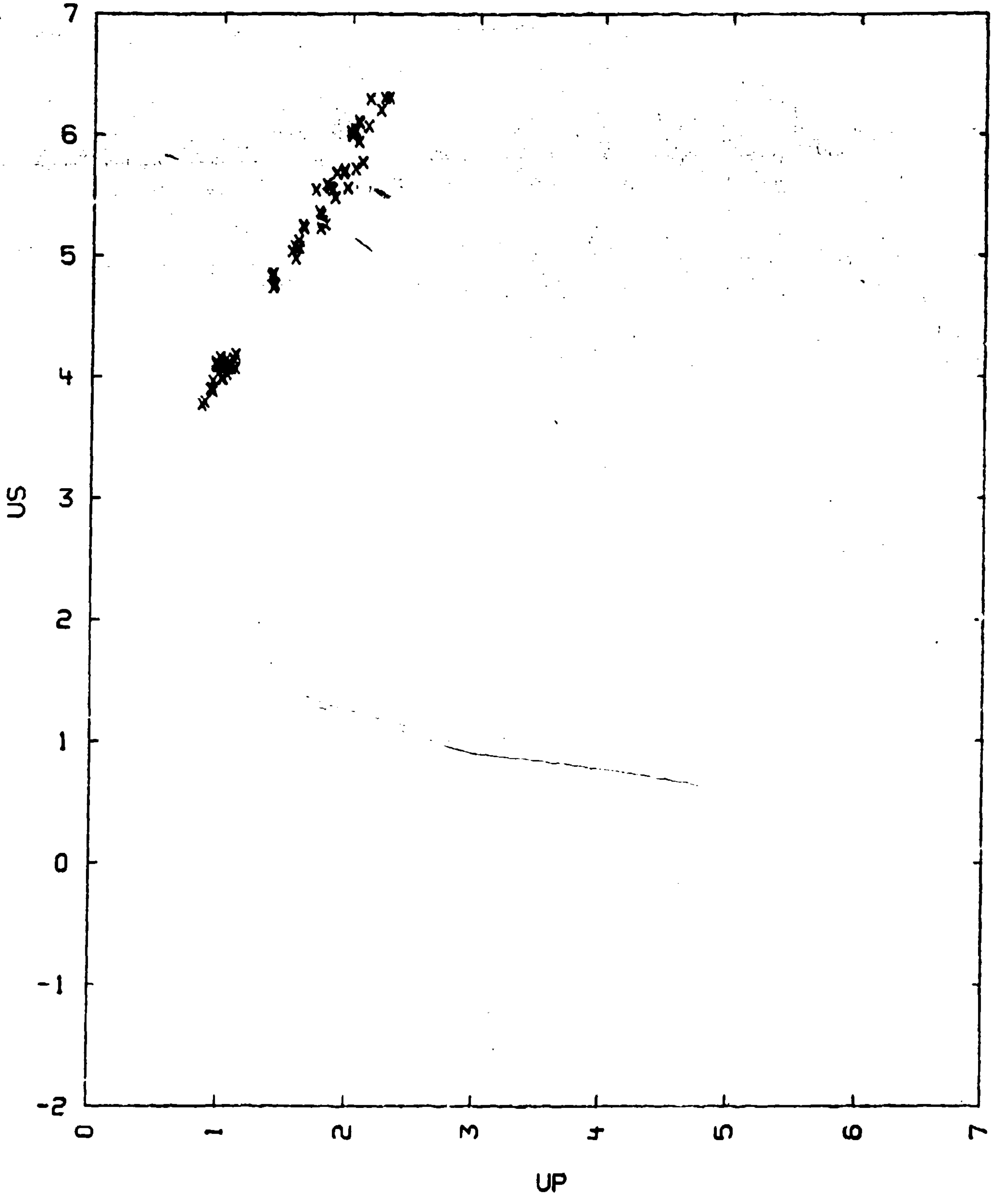
1) SOURCE: BERGER J. AND FAUQUIGNON C.
PRIVATE COMMUNICATION (1964), B.P. NO. 7, SEVRAN, FRANCE

2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIALS ALUMINUM AU4G

3. SAMPLE DIMENSIONS FOR THE US MEASUREMENTS: 2.0 CM DIAMETER
0.5 CM THICKNESS
SAMPLE DIMENSIONS FOR THE UFS MEASUREMENTS: 2.0 CM DIAMETER
0.25 CM THICKNESS

TABLE I

PLEXIGLAS (POLYMETHYLMETHACRYLATE)
23-2-1(5-8-2)---11



23-2-1(5-8-2)---12
POLYMETHYLMETHACRYLATE

(H2-C-C(C-H3)-C-O2-C-H3)N = (C5-H8-O2)N

V0 = 0.847 CC/G.   C0 = 2.71 KM/SEC. SIGMA = 0.03 KM/SEC.

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC., VELOCITIES IN KM/SEC., AND PRESSURE IN KILOBARS. X DESIGNATES THE SAMPLE THICKNESS WHICH IS GIVEN IN MM.

TABLE

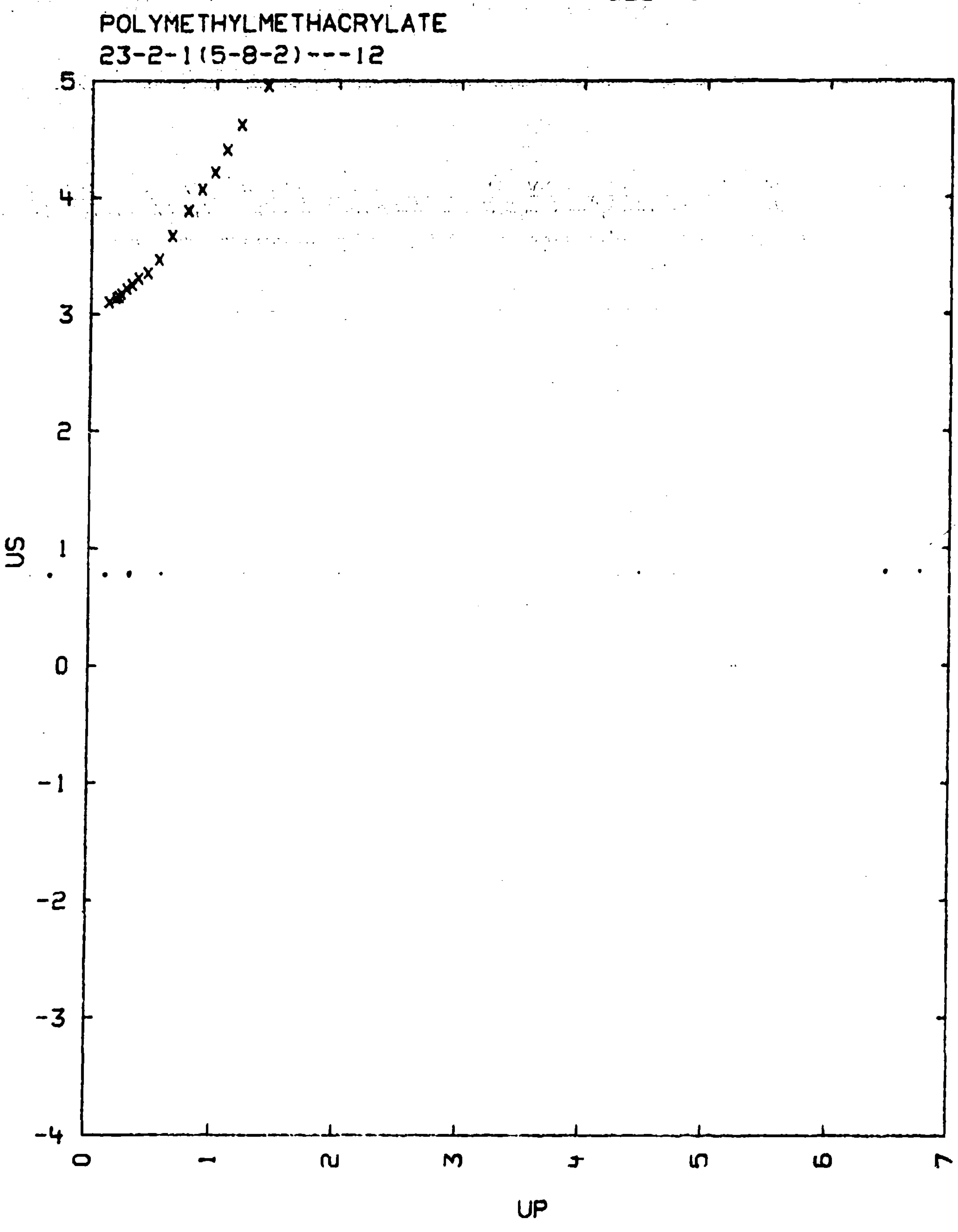
RHO0	US	UP	P	V/V0	X
1.18	4.95	1.420	82.4	0.715	10
-	4.62	1.210	66.0	0.738	15
-	4.40	1.088	56.6	0.753	20
-	4.21	0.990	49.2	0.765	25
-	4.06	0.890	42.6	0.781	30
-	3.88	0.780	35.7	0.799	35
-	3.66	0.650	28.1	0.822	40
-	3.46	0.538	22.0	0.845	45
-	3.35	0.455	18.0	0.864	50
-	3.30	0.383	14.9	0.884	55
-	3.24	0.325	12.4	0.900	60
-	3.21	0.283	10.7	0.912	65
-	3.17	0.245	9.2	0.923	70
-	3.14	0.225	8.3	0.928	75
-	3.13	0.200	7.4	0.936	80
-	3.10	0.145	5.3	0.953	100

US = 2.95 + 0.85 UP KM/SEC. FROM UP = 0.145 TO 0.455 KM/SEC.
US = 2.56 + 1.69 UP KM/SEC. FROM UP = 0.538 TO 1.420 KM/SEC.

COMMENTS:

1) SOURCE: LIDDIARD T. P.
THE FOURTH SYMPOSIUM ON DETONATION, VOL. 1, B-47 (1965)
2) EXPERIMENTAL TECHNIQUE: A TIME RESOLVED SHADOWGRAPH OF THE POSITION OF THE SHOCK FRONT AND A SMALL THIN FOIL WHICH IS ACCELERATED BY THE INITIAL PULSE REACHING THE FREE SURFACE, YIELDED US AND FOIL VELOCITY (UFS)
DATA REDUCTION TECHNIQUE: D., WITH THE RELATIONSHIP 2UP = UFS.
3) C0 WAS MEASURED WITH PRESSURE WAVES PRODUCED IN THE SAMPLE BY AN EXPLODING WIRE.

TABLE I



POLYMETHYLMETHACRYLATE
23-2-1(5-8-2)---12
US
UP
5
4
3
2
1
0
-1
-2
-3
-4
0
1
2
3
4
5
6
7

23-2-1(5-B-2)---13
PLEXIGLAS (POLYMETHYLMETHACRYLATE)

POLYMETHYLMETHACRYLATE (H2-C-C(C-H3)-C-O2-C-H3)N = (C5-H8-O2)N

V0 = 0.849 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, PRESSURE IN KILOBARS, 1 REFERS TO IMPACT SURFACE OF SAMPLE, 2 REFERS TO BACK SURFACE OF SAMPLE, AV REFERS TO THE AVERAGE VALUE ACROSS THE SAMPLE

TABLE

RHO0	US1	UP1	P1	V1/V0	USAV	P2
1.178	2.93	0.0943	3.25	0.9678	2.96	
-	3.13	0.142	5.24	0.9545	3.00	4.9
-	3.12	0.203	7.46	0.9348	3.04	6.3
-	3.14	0.203	7.50	0.9353	3.06	6.4
-	3.10	0.246	8.99	0.9207	3.04	
-	3.01	0.280	9.94	0.9070	3.16	8.9
-	3.20	0.276	10.4	0.9138		
-	3.28	0.274	10.6	0.9168	3.13	9.0
-	3.45	0.377	15.3	0.8920		
-	3.61	0.459	19.5	0.8728		
-	3.43	0.524	21.2	0.8476		

US1 = 2.84 + 1.36*UP1 KM/SEC FOR UP BETWEEN 0.09 AND 0.52 KM/SEC
SIGMA US1 = 0.11 KM/SEC

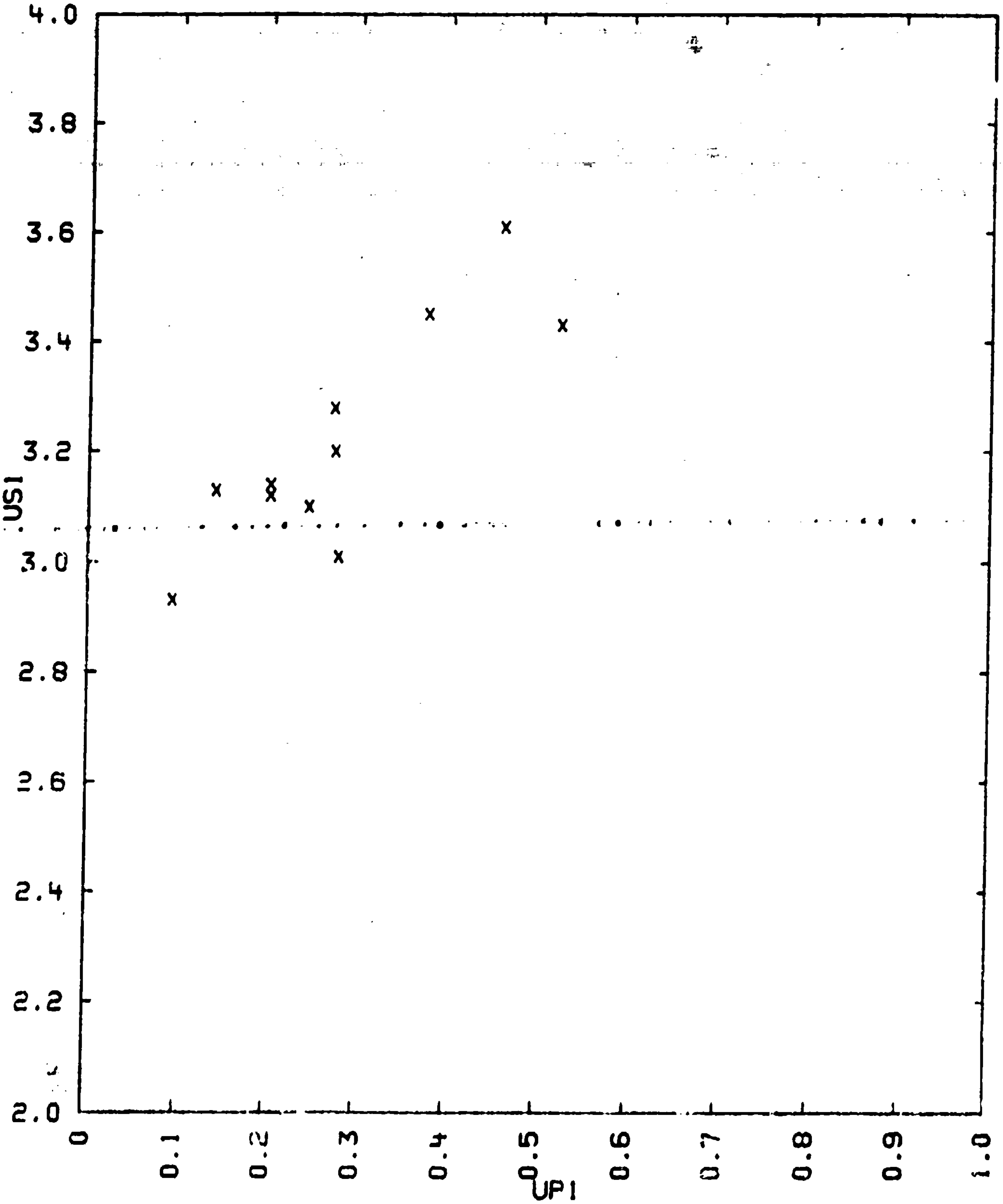
COMMENTS:

1) SOURCE: HALPIN, W. J. AND GRAHAM, R. A.
SHOCK WAVE COMPRESSION OF PLEXIGLAS FROM 3 TO 20 KBAR
PRESENTED AT THE FOURTH SYMPOSIUM ON DETONATION
P. 388, OCT. 1965. HELD AT THE U. S. NAVAL ORDNANCE
LABORATORY, WHITE OAK, SILVER SPRING MARYLAND.
2) EXPERIMENTAL TECHNIQUE I
DATA REDUCTION TECHNIQUE C
3) THE PRESSURE DIFFERENCE BETWEEN THE IMPACT SURFACE AND THE BACK SURFACE OF THE SAMPLE SHOWS A DECREASE OF PRESSURE WHILE THE SHOCK WAVE TRAVERSES THE SAMPLE.
4) THE PRESSURES MEASURED AT THE IMPACT AND BACK SURFACE SUGGEST A PRESSURE ATTENUATION OF THE SHOCK WAVE.

TABLE I

PLEXIGLAS (POLYMETHYLMETHACRYLATE)

23-2-1(5-8-2)---13



23-2-1(5-8-2)---14
POLYMETHYLMETHACRYLATE

(H2-C-C(C-H3)-C-02-C-H3)N = (C5-H8-02)N

V0 = 0.862 CC/G

THE TABLE LISTS DENSITY IN G/CC, VELOCITY IN KM/SEC AND PRESSURE IN KBARS.

TABLE

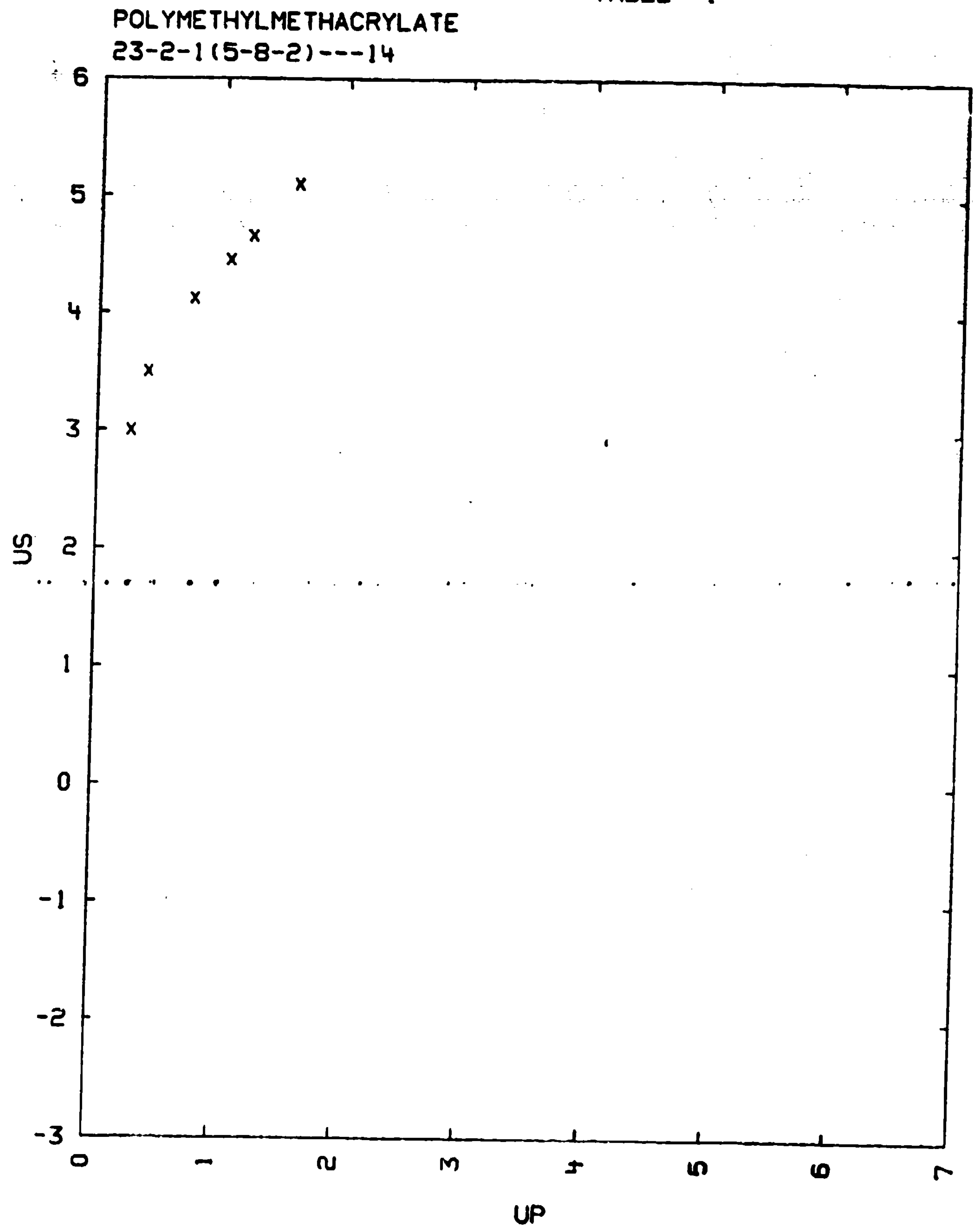
RHO0	US	UP	P	V/V0
1.16	2.992	0.27	9.4	0.91
-	3.50	0.40	16.2	0.894
-	4.12	0.77	36.8	0.812
-	4.45	1.06	54.5	0.762
-	4.65	1.24	67.	0.735
-	5.1	1.60	95.	0.69

US = 2.47 + 2.49*UP - 0.54*UP**2 KM/SEC.
SIGMA US = 0.11 KM/SEC.

COMMENTS:

1) SOURCE: DAPOIGNY, J., KIEFFER, J. AND VODAR, B.
COMPTES RENDUS. VOL. 245, P. 1502 (1957)
2) EXPERIMENTAL TECHNIQUE J1
DATA REDUCTION METHOD E (EXEPT FOR THE 95 KBAR POINT WHICH WAS CALCULATED FROM THE MOTION OF THE EXPLOSIVE-SAMPLE INTERFACE.
3) THE DETONATION FRONT MOVED PARALLEL TO THE SAMPLE SURFACE GENERATING A STRONGLY ATTENUATING SHOCK WAVE AT SOME ANGLE TO THE SAMPLE-EXPLOSIVE INTERFACE. THE ABOVE POINTS WHERE OBTAINED ON A SINGLE EXPERIMEN
4) THE SHOCK-PARTICLE VELOSITY FUNCTION CURVES TOWARDS THE UP AXIS AS IN 23-2-1(5-8-2)---7, WHERE A SIMILAR SHOCK CONFIGURATION WAS USED.

TABLE I



POLYMETHYLMETHACRYLATE
23-2-1(5-8-2)---14
US
UP
6
5
4
3
2
1
0
-1
-2
-3
0
1
2
3
4
5
6
7

23-2-1(5-8-2)---15
PLEXIGLAS (POLYMETHYLMETHACRYLATE)

(H2-C-C(C-H3)-C(0)-0-C-H3)N = (C5-H8-02)N

V0 = 0.847 CC/G.

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC., VELOCITIES IN KM/SEC., AND PRESSURE IN KILOBARS.

TABLE

RHO0	US	UFS	UP	P	V/V0
1.18	4.68	2.60	1.30	71.8	0.722
-	4.98	3.00	1.50	88.0	0.699
-	5.27	3.40	1.70	106.0	0.677
-	5.55	3.80	1.90	124.0	0.658
-	5.84	4.20	2.10	145.0	0.640
-	6.12	4.60	2.30	166.0	0.624
-	6.39	5.00	2.50	189.0	0.609
-	6.67	5.40	2.70	213.0	0.595
-	6.94	5.80	2.90	238.0	0.582

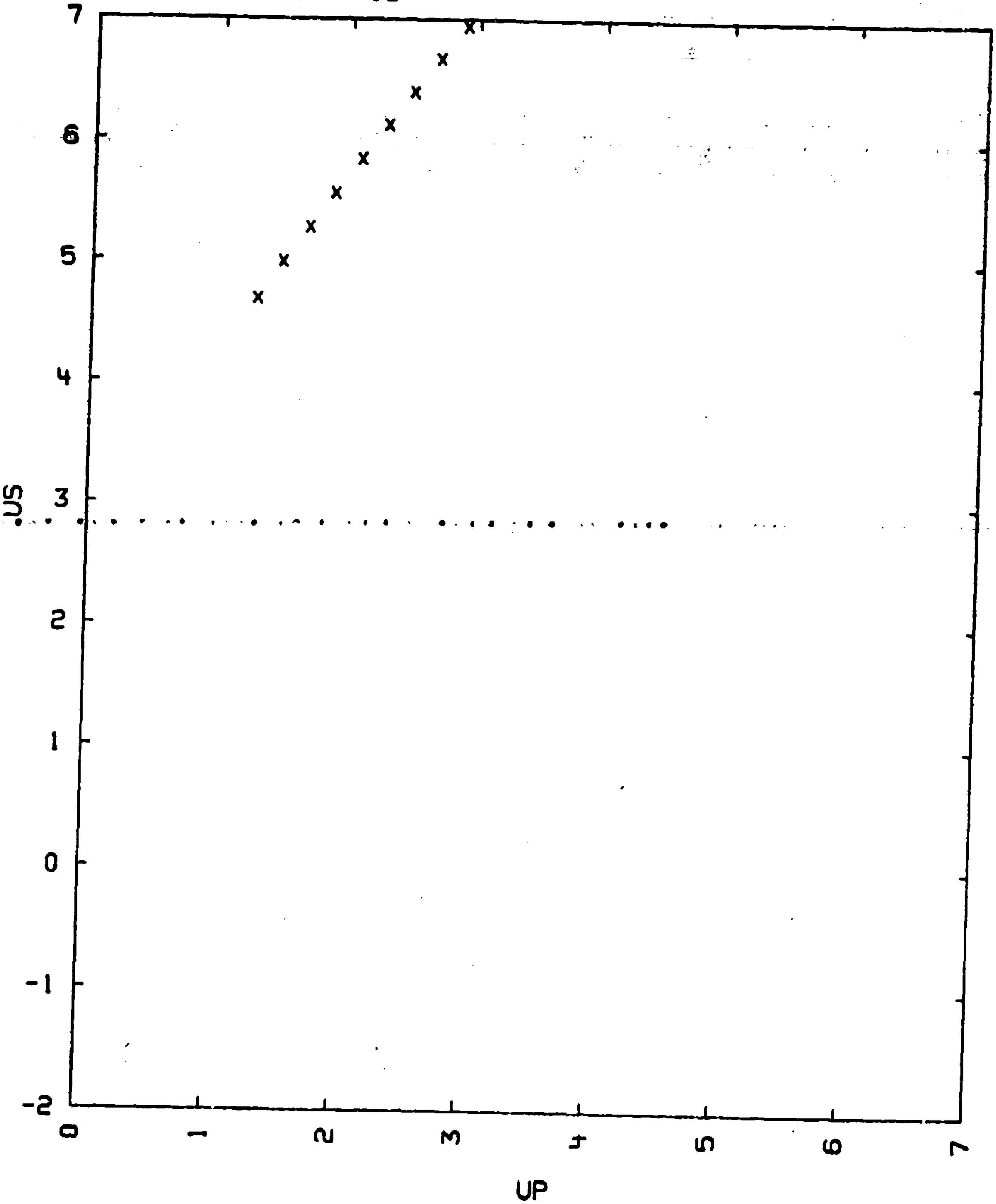
US = 2.87 + 1.41 UP KM/SEC. SIGMA US = 0.01 KM/SEC.

COMMENTS:

1) SOURCE: COLEBURN, N. L.
NAVWEPS REPORT 6026, 1960
U. S. NAVAL ORDNANCE LAB., WHITE OAK, MARYLAND.
2) EXPERIMENTAL TECHNIQUE C AND B.
DATA REDUCTION TECHNIQUE D, ASSUMING 2UP = UFS
3) EXPERIMENTAL ERROR IN THE FREE-SURFACE VELOCITY (UFS) IS 3 PERCENT. A CORRECTION FOR SHOCK TILT WAS APPLIED, REDUCING THE MEASURED ERROR IN US BY A FACTOR OF 10. THE ESTIMATED EXPERIMENTAL ERROR IN US IS 0.5 PERCENT. THE SHOCK FRONT WAS TILTED WITH RESPECT TO THE SURFACE BY 14 AND 22 DEGREES. UFS AND UP WHERE ASSUMED PARALLEL TO EACH OTHER AND PERPENDICULAR TO THE SHOCK FRONT.
4. THE VELOCITIES MEASURED WITH METHOD B WERE BE 10 PERCENT FASTER THAN THOSE MEASURED WITH METHOD C, BECAUSE OF THE LARGE AMOUNT OF GAS COMPRESSED IN THE FREE SURFACE GAP. EXPERIMENTS WITH METHOD B WERE ACCORDINGLY CORRECTED BY THIS FACTOR.

TABLE I

PLEXIGLAS (POLYMETHYLMETHACRYLATE)
23-2-1(5-8-2)---15



23-2-1(5-8-2)---18
LUCITE (POLYMETHYLMETHACRYLATE)

POLYMETHYLMETHACRYLATE (H2-C-C(C-H3)-C-O2-C-H3)N

VO = 0.845 CC/G   CL = 2.69 KM/SEC   CO = 2.17 KM/SEC
CS = 1.38 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
1.180	4.88	1.25	69.	0.7318	2024 AL	6.44
1.180	4.65	1.28	70.	0.7247	2024 AL	6.47
1.180	4.64	1.28	70.	0.7241	2024 AL	6.47
1.180	5.20	1.64	101.	0.6846	2024 AL	6.81
1.180	6.00	2.10	149.	0.6500	2024 AL	7.28
1.180	6.18	2.19	160.	0.6456	2024 AL	7.38
1.186	9.56	4.66	528.	0.5126	2024 AL	9.95
1.186	9.74	5.09	588.	0.4774	2024 AL	10.35

US = 2.551 + 1.645*UP   KM/SEC FOR UP LESS THAN 3 KM/SEC
SIG US = 0.039 KM/SEC

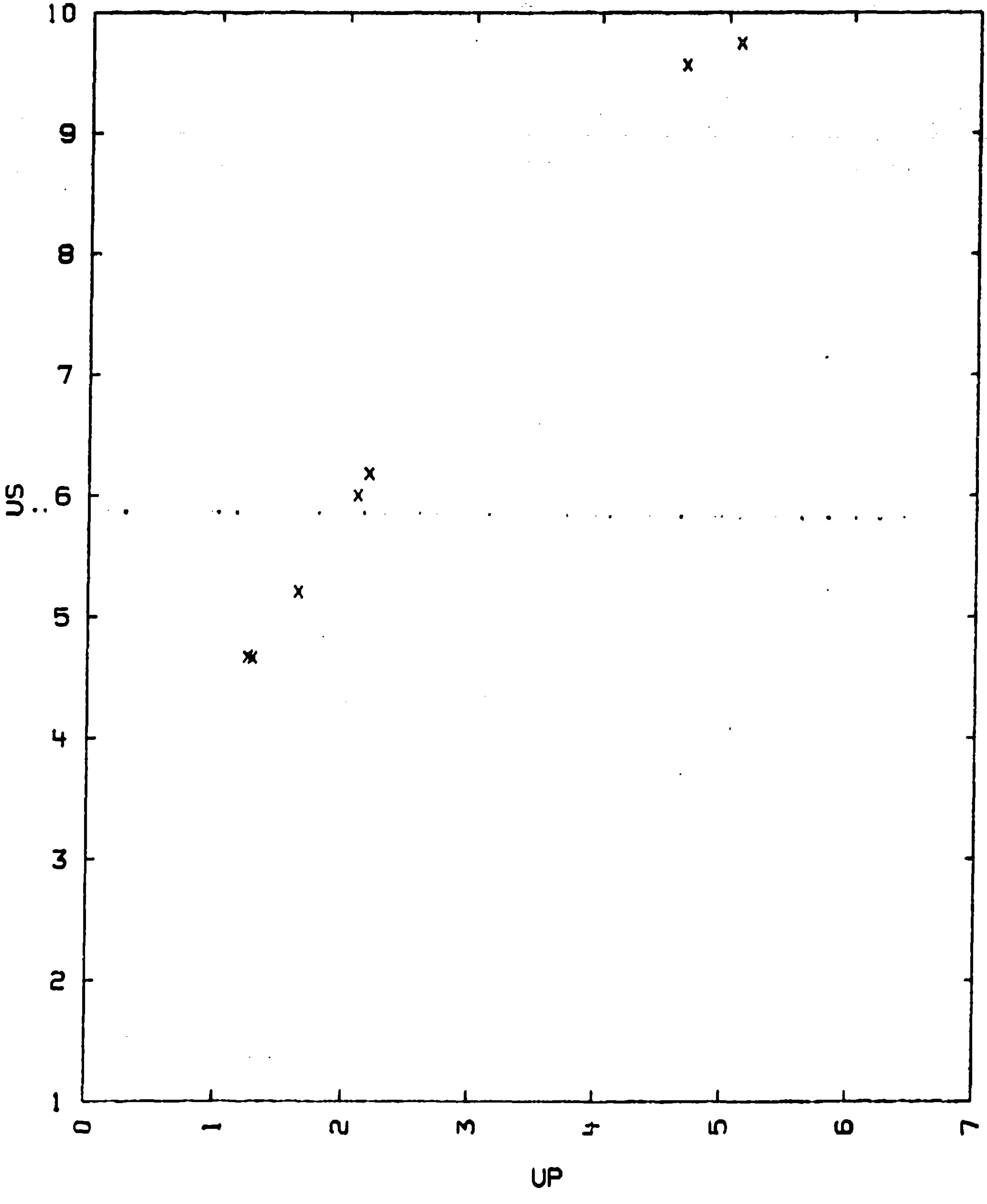
COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE : B
DATA REDUCTION TECHNIQUE : B

TABLE I

LUCITE (POLYMETHYLMETHACRYLATE)

23-2-1(5-8-2)---16



23-2-1(5-8-2)---17
PLEXIGLAS (POLYMETHYLMETHACRYLATE)

POLYMETHYLMETHACRYLATE (H2-C-C(C-H3)-C-02-C-H3)N

VO = 0.841 CC/G   CL = 2.72 KM/SEC   CO = 2.19 KM/SEC
                       CS = 1.40   -   CB = 2.18   -

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
1.186	3.45	0.54	22.	0.8435	2024 AL	5.79
1.186	3.70	0.72	32.	0.8054	2024 AL	5.94
1.189	3.76	0.76	34.	0.7979	2024 AL	5.98
1.186	3.72	0.76	34.	0.7957	2024 AL	5.98
1.189	3.74	0.79	35.	0.7888	921-T AL	5.76
1.186	4.04	0.97	46.	0.7599	2024 AL	6.17
1.186	4.05	0.98	47.	0.7580	2024 AL	6.18
1.180	4.26	1.13	57.	0.7347	2024 AL	6.32
1.182	4.28	1.15	58.	0.7313	2024 AL	6.33
1.180	4.24	1.15	58.	0.7288	2024 AL	6.33
1.186	4.78	1.34	76.	0.7197	2024 AL	6.53
1.186	4.78	1.34	76.	0.7197	2024 AL	6.53
1.189	4.67	1.34	74.	0.7131	2024 AL	6.53
1.186	4.66	1.36	75.	0.7082	2024 AL	6.54
1.184	4.59	1.37	74.	0.7015	2024 AL	6.55
1.189	4.70	1.46	82.	0.6894	921-T AL	6.43
1.180	5.04	1.62	96.	0.6786	2024 AL	6.79
1.180	5.05	1.63	97.	0.6772	2024 AL	6.80
1.186	5.33	1.69	107.	0.6829	2024 AL	6.88
1.186	5.33	1.69	107.	0.6829	2024 AL	6.88
1.189	5.14	1.74	106.	0.6615	2024 AL	6.91
1.186	5.30	1.78	112.	0.6642	2024 AL	6.95
1.189	5.30	1.87	118.	0.6472	921-T A	6.86
1.189	5.30	1.87	118.	0.6472	921-T AL	6.86
1.186	5.51	1.89	124.	0.6570	2024 AL	7.07
1.180	5.81	2.17	149.	0.6265	2024 AL	7.33
1.189	6.24	2.37	176.	0.6202	2024 AL	7.55
1.186	6.24	2.38	176.	0.6186	2024 AL	7.55
1.189	6.32	2.39	180.	0.6218	921-T AL	7.43
1.186	6.32	2.40	180.	0.6203	2024 AL	7.58
1.186	6.19	2.42	178.	0.6090	2024 AL	7.58
1.186	6.44	2.47	189.	0.6165	2024 AL	7.66
1.189	6.32	2.48	186.	0.6076	921-T AL	7.52
1.186	6.69	2.64	209.	0.6054	2024 AL	7.83
1.186	6.69	2.64	209.	0.6054	2024 AL	7.83
1.186	6.84	2.79	226.	0.5921	2024 AL	7.97
1.186	6.83	2.79	226.	0.5915	2024 AL	7.97
1.186	6.83	2.83	229.	0.5857	2024 AL	8.01

PLEXIGLAS (POLYMETHYLMETHACRYLATE)

RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
1.186	6.82	2.83	229.	0.5850	2024 AL	8.01
1.186	8.77	4.35	452.	0.5040	2024 AL	9.57
1.186	8.76	4.35	452.	0.5034	2024 AL	9.57
1.189	9.56	4.66	530.	0.5126	2024 AL	9.95
1.189	9.81	5.07	591.	0.4832	2024 AL	10.35

US = 2.572 + 1.536*UP KM/SEC FOR UP BELOW 3 KM/SEC
SIG US = 0.084 KM/SEC

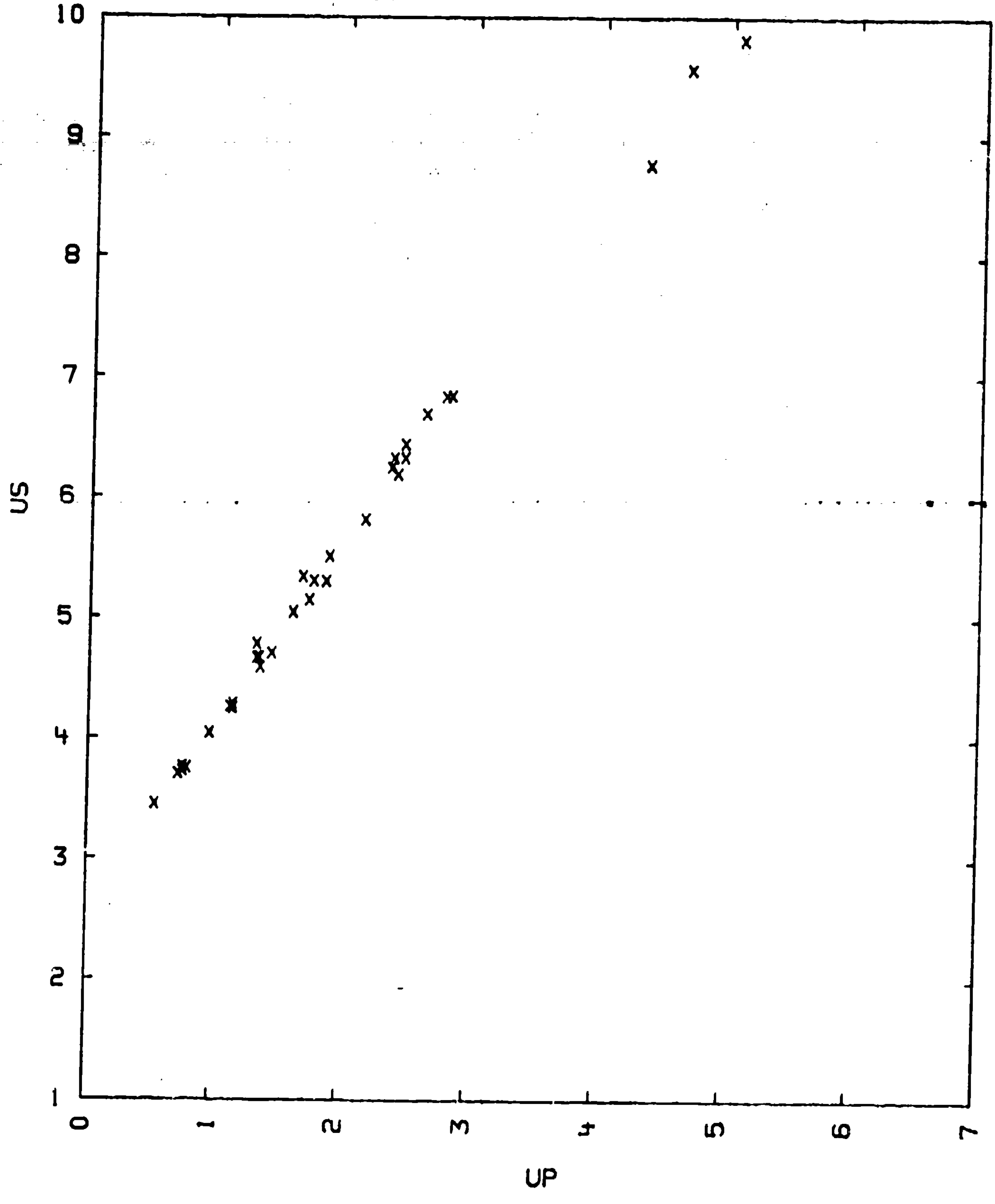
COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE : B
DATA REDUCTION TECHNIQUE : B

TABLE I

PLEXIGLAS (POLYMETHYLMETHACRYLATE)

23-2-1(5-8-2)---17



23-2-1(5-8-2)---18
PLEXIGLAS (POLYMETHYLMETHACRYLATE)

(H2-C-C(C-H3)-C(O)-O-C-H3)N

V0 = 0.8475

THE TABLE LISTS RHO0 IN G/CC, VELOCITIES IN KM/SEC AND P IN KBARS.
CU = COPPER, FS = FANSTEEL AND WF = WEIGHTING FACTOR.

TABLE

- - - - SAMPLE				- - - -	- IMPACTOR -	
RHO0	US	UP	P	V/V0	MAT	U
1.180	10.482	5.592	692.	.4666	CU	6.907
1.180	12.075	6.833	981.	.4300	FS	7.902

US = 3.10 + 1.32*UP KM/SEC (3.0 <UP< 8.0)

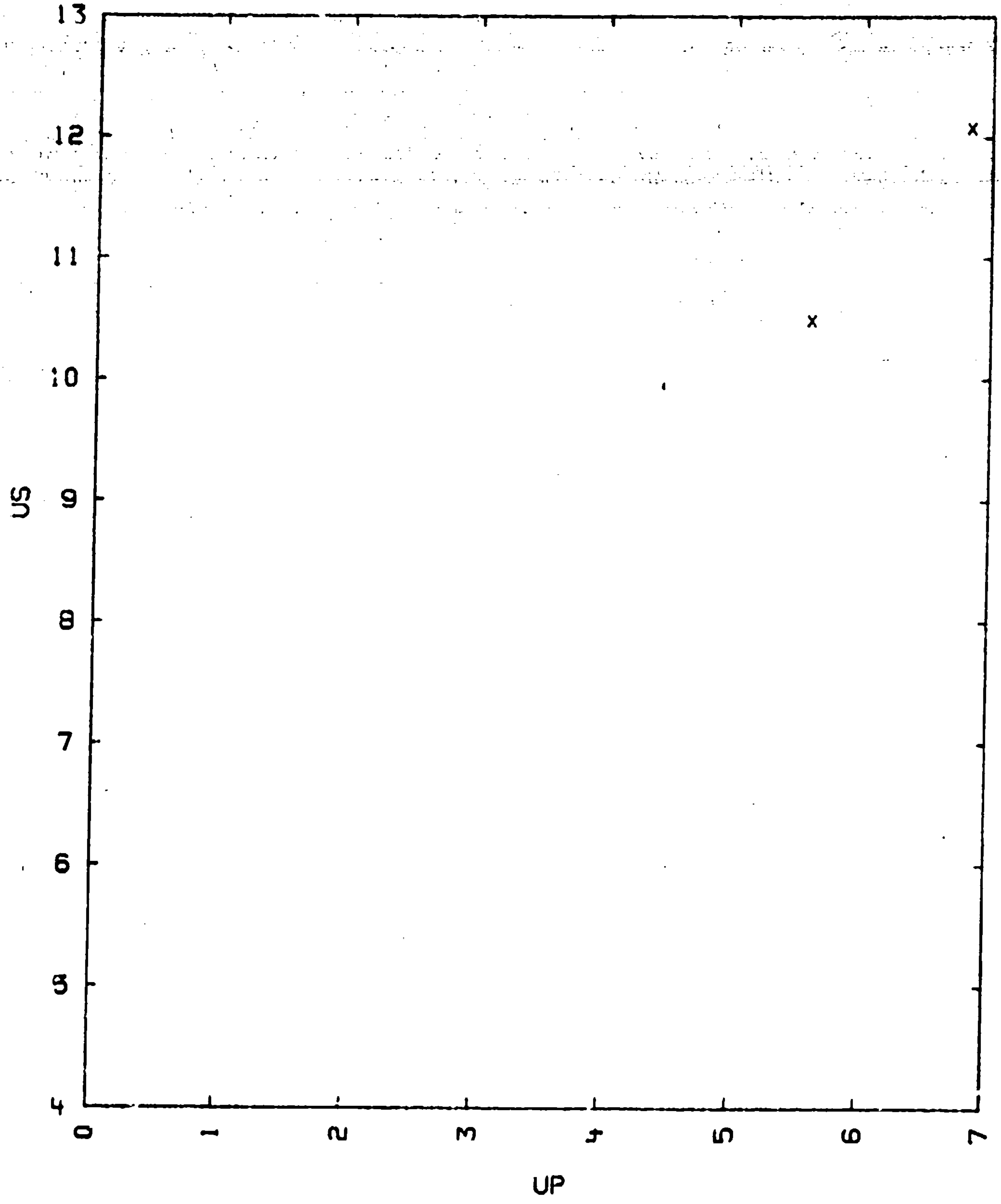
COMMENTS:

1) SOURCE: ISBELL W.M., SHIPMAN F.H. AND JONES A.H.
HUGONIOT EQUATION OF STATE OF ELEVEN MATERIALS TO FIVE MBARS.
MATERIALS SCIENCE LABORATORY REPORT: MSL-68-1
2) EXPERIMENTAL TECHNIQUE: A
DATA REDUCTION METHOD : A
3) NOMINAL UNCERTAINTIES ARE: (SIG.US)/US= .005 AND (SIG.U)/U= .005

TABLE I

PLEXIGLAS (POLYMETHYLMETHACRYLATE)

23-2-1(5-8-2)---18



23-2-1(5-12-1)---1
N-AMYL ALCOHOL

H3-C(H2)3-C(H2)-O-H = C5-H12-O

TO= 19-23 DEG. CENTIGRADE
VO = 1.227-1.236 CC/G

CO(20 DEG. C) = 1.294 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC., PRESSURE IN KILOBARS, DENSITY IN G/CC AND TEMPERATURE IN DEG. CENTIGRADE.

TABLE

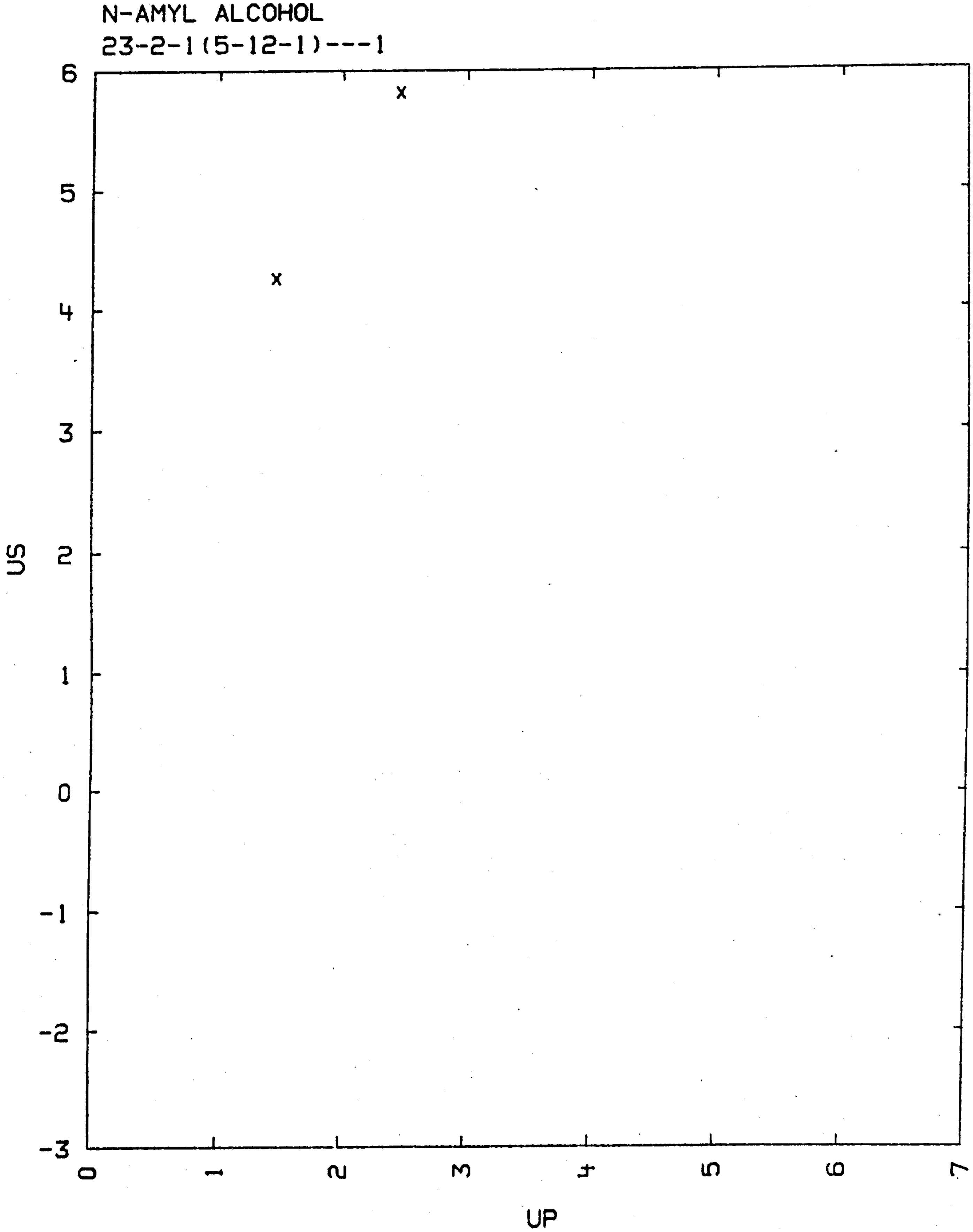
TO	RHOO	US	UP	P	V/VO
23	0.8091	5.81	2.465	115.9	0.576
19	0.8150	4.26	1.466	50.9	0.656

US = 1.98 + 1.55*UP KM/SEC

COMMENTS:

1) SOURCE: WALSH J. M. AND RICE M. H.
JOURNAL OF CHEMICAL PHYSICS, VOL. 26, P. 815 (1957)
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL 24ST ALUMINUM
3) THE ABOVE VALUE OF CO WAS OBTAINED FROM
BERGMANN L., DER ULTRASCHALL (S.HIRZEL VERLAG, STUTTGART 1954)

TABLE I



23-2-1(18-20-3)---1
PHENOXY

BISPHENOL-EPI RESIN (C18-H20-O3)N NOTE 3

VO = 0.849 CC/G CL = 2.51 KM/SEC CO = 2.18 KM/SEC
CS = 1.07 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

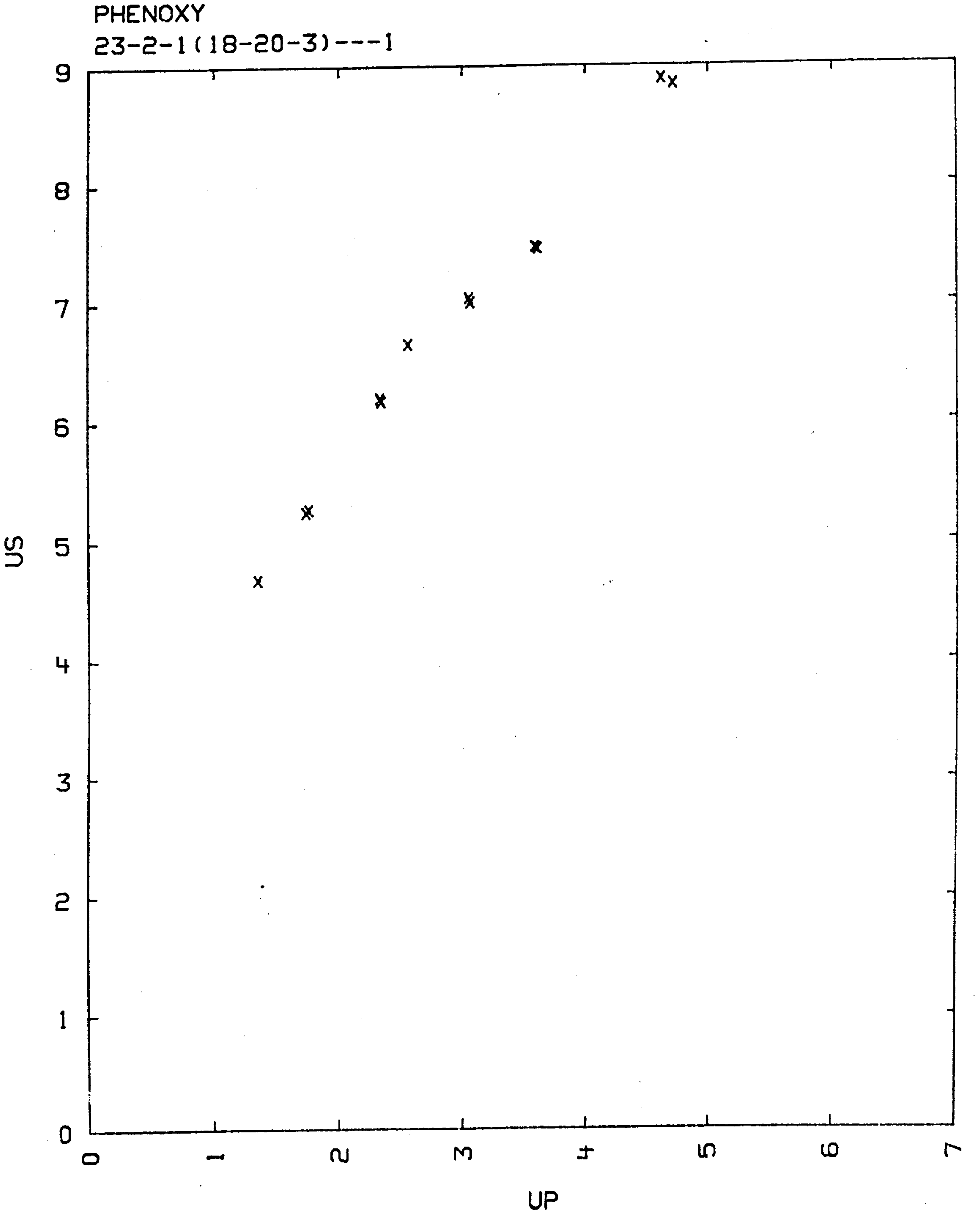
-----SAMPLE-----					-----STANDARD-----	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
1.170	4.68	1.36	74.	0.7094	2024 AL	6.54
1.178	4.69	1.37	76.	0.7079	2024 AL	6.55
1.179	5.24	1.75	108.	0.6660	2024 AL	6.92
1.178	5.27	1.77	110.	0.6641	2024 AL	6.93
1.178	6.19	2.34	171.	0.6220	2024 AL	7.51
1.179	6.17	2.35	171.	0.6191	2024 AL	7.52
1.179	6.64	2.56	200.	0.6145	2024 AL	7.75
1.178	7.03	3.05	253.	0.5561	2024 AL	8.22
1.178	7.00	3.06	252.	0.5629	2024 AL	8.23
1.178	7.46	3.59	315.	0.5188	2024 AL	8.75
1.179	7.45	3.61	317.	0.5154	2024 AL	8.76
1.178	8.88	4.62	483.	0.4797	2024 AL	9.82
1.179	8.83	4.72	491.	0.4655	2024 AL	9.91

US = 2.486 + 1.591*UP KM/SEC FOR UP BELOW 2.9 KM/SEC
SIG US = 0.05 KM/SEC
US = 3.398 + 1.159*UP KM/SEC FOR UP ABOVE 3.2 KM/SEC
SIG US = 0.12 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B
3) THE ABOVE COMPOSITION IS ONE GIVEN FOR UNION CARBIDES P.R.D.A. 8100 (JIM RINDE UCID 15815, LAWRENCE LIVERMORE LABORATORY, CALIF. 94550) AND CONSISTENT WITH THE DESCRIPTION IN MODERN PLASTICS ENCYCLOPEDIA (MC GRAW HILL, N.Y., 1975)

TABLE I



23-2-1(7-8-1)---1
TOLUENE

C6(H5)-C-H3 = C7-H8-0

TO = 4-15 DEG. C.
VO = 1.138-1.141 CC/G

CO(20 DEG. C.) = 1.328 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC., PRESSURE IN KILOBARS, DENSITY IN G/CC AND TEMPERATURE IN DEG. CENTIGRADE.

TABLE

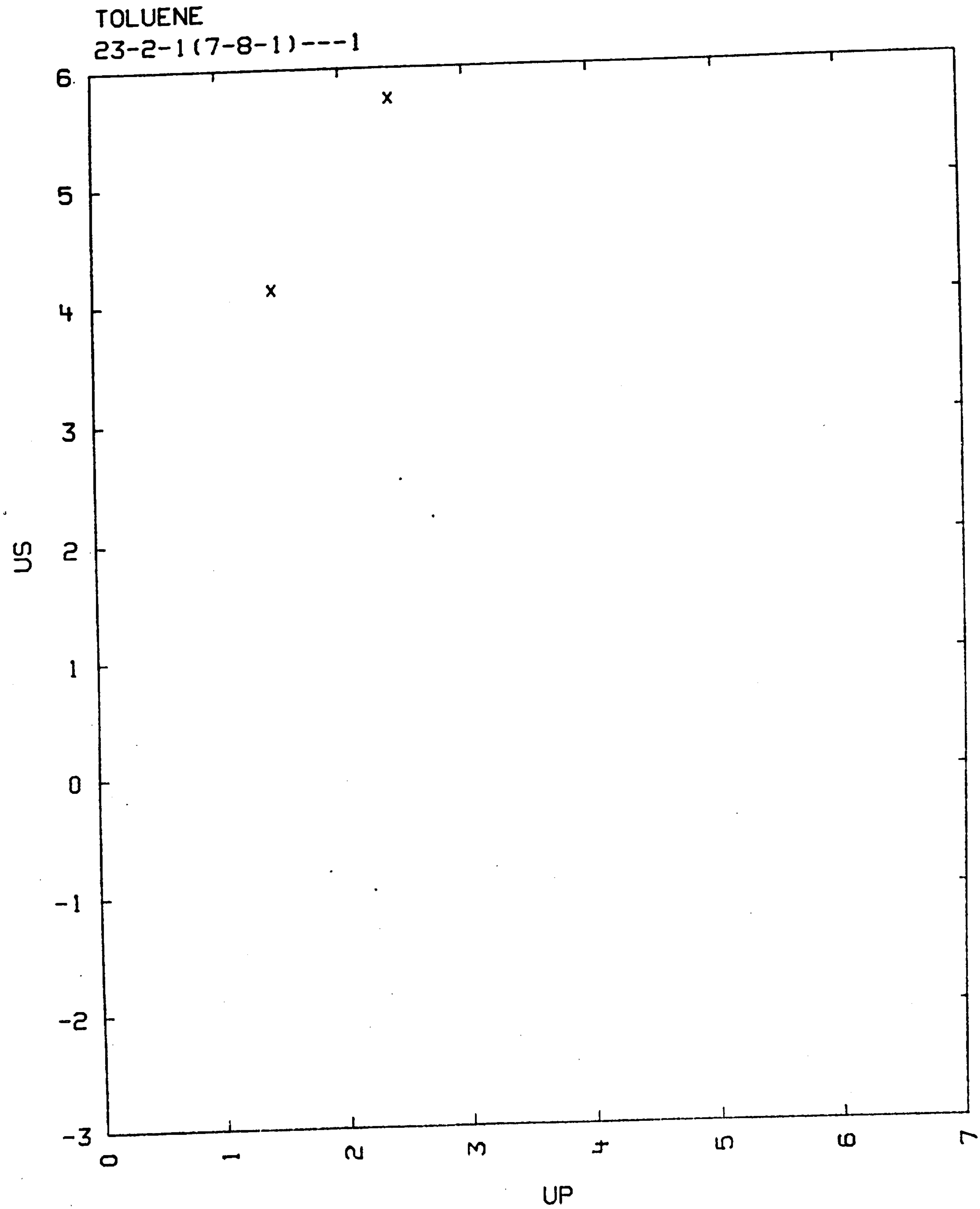
TO	RHOO	US	UP	P	V/VO
4	0.8787	5.73	2.412	121.5	0.579
15	0.8764	4.12	1.443	52.1	0.650

US = 1.72 + 1.66*UP KM/SEC

COMMENTS:

1) SOURCE: WALSH J. M. AND RICE M. H.
JOURNAL OF CHEMICAL PHYSICS, VOL. 26, P. 815 (1957)
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL 24ST ALUMINUM
3) THE ABOVE VALUE OF CO WAS OBTAINED FROM
BERGMANN, DER ULTRASCHALL (S. HIRZEL VERLAG, STUTTGART 1954)

TABLE I



23-2-1(11-8-3)---1
DURITE

PHENOL-FURFURAL (C11-H8-O3)N

VO = 0.725 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

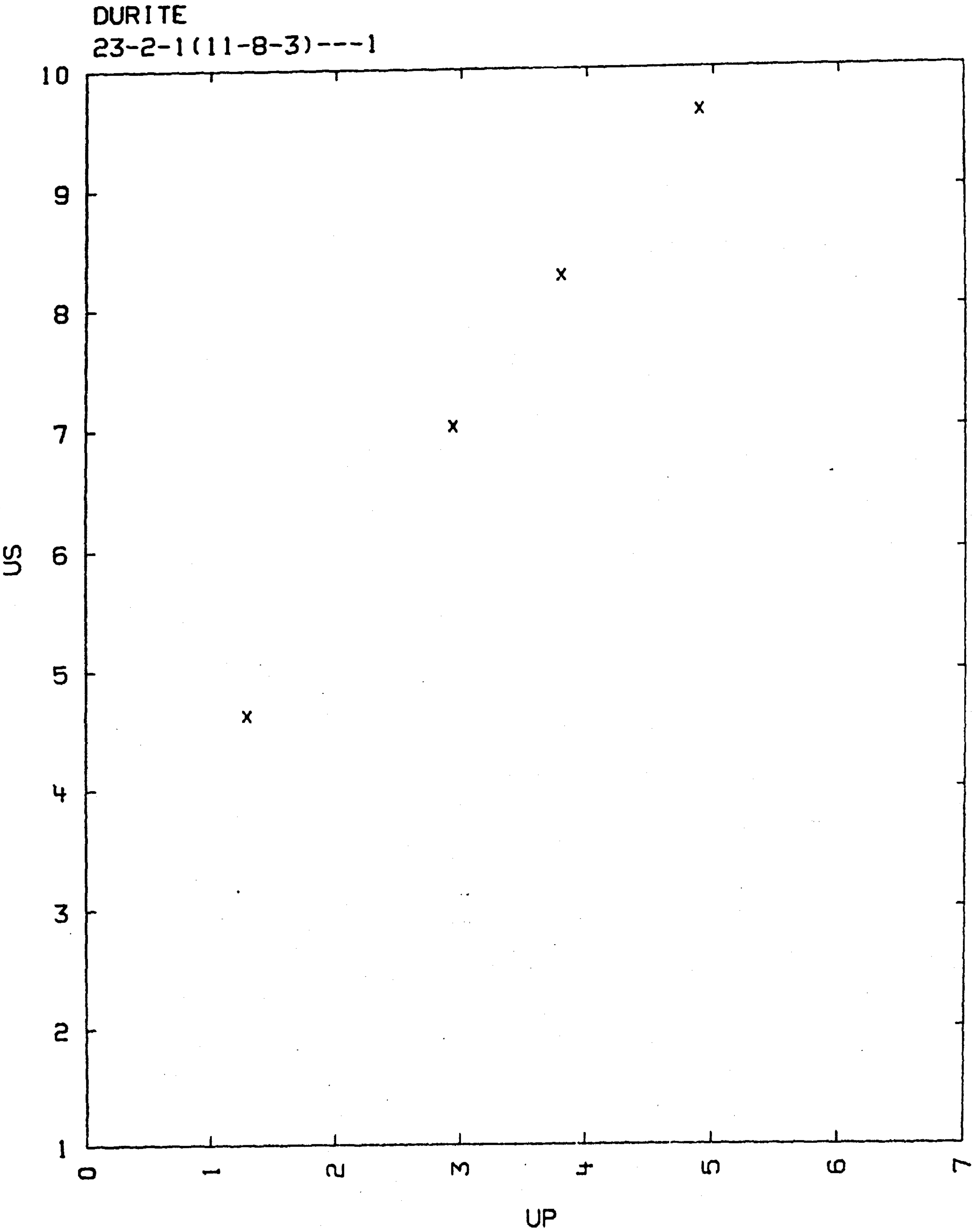
SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
1.379	4.62	1.30	83.	0.7186	2024 AL	6.53
1.378	7.02	2.94	284.	0.5812	2024 AL	8.24
1.382	8.27	3.79	433.	0.5417	2024 AL	9.16
1.382	9.63	4.89	651.	0.4922	2024 AL	10.35

US = 2.847 + 1.404*UP KM/SEC
SIGMA US = 0.105 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B
3) DURITE IS A LINE OF PLASTICS, E.G., A CLASS OF FORMALDAHYDE OR PHENOLFURFURAL MOLDING COMPOUNDS SOLD BY DURITE PLASTICS DIVISION OF APPROXIMATELY EQUIMOLAR IN THE MONOMERS AND WITHOUT FILLER.
CHEMICAL ANALYSIS NOT AVAILABLE

TABLE I



23-9(2-4)---0
TEFLON SUMMARY

POLYTETRAFLUOROETHYLENE (F2-C-C-F2)N = (C2-F4)N

V0 = 0.459 - 1.023 CC/G

THE TABLE LISTS HUGONIOT POINTS CALCULATED FROM THE FIT GIVEN BELOW.
UNITS ARE: G/CC, KM/SEC, KBAR,AND KBAR.CC/G FOR THE ENERGY DIFFERENCE.

TABLE

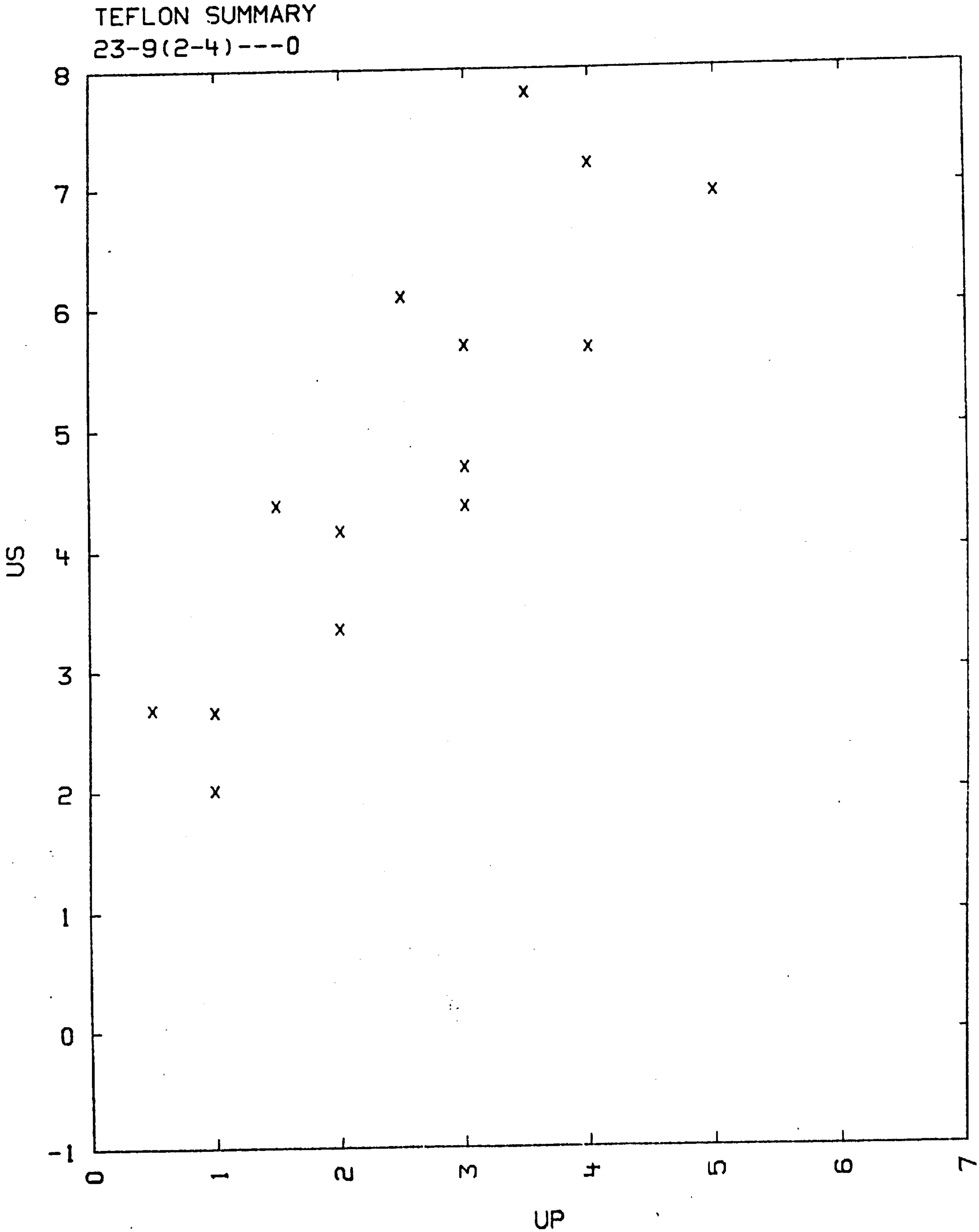
RHO0	US	UP	P	V/V0	E-E0
2.170	2.681	.5	29.1	0.813	1.25
-	4.383	1.5	143.	0.658	11.2
-	6.087	2.5	330.	0.589	31.2
-	7.790	3.5	592.	0.551	61.2
1.530	2.650	1.0	40.5	0.623	5.0
-	4.161	2.0	127.	0.519	20.0
-	5.672	3.0	360.	0.471	45.0
-	7.183	4.0	440.	0.443	80.
0.977	2.003	1.0	19.6	0.501	5.0
-	3.348	2.0	65.4	0.403	20.0
-	4.693	3.0	138.	0.361	45.0
0.780	4.370	3.0	102.	0.313	45.0
-	5.656	4.0	176.	0.293	80.
-	6.942	5.0	271.	0.280	125.

US = 1.865 + 1.712*UP - 1.200(2.20-RHO0) - 0.300(2.20-RHO0)UP
0.174(2.20-RHO0)**2
SIG.US = 0.14 KM/SEC. FOR UP IN THE LIMITS OF THE TABLE

COMMENTS:

1) SOURCE: COMPILER
DATA FROM 23-9(2-4)---1,4,AND 5 WERE USED FOR THIS SUMMARY.
2) DATA OF 23-9(2-4)---2 IS OLDER AND LESS RELIABLE
3) SPECIAL HIGH DENSITY TEFLON WAS USED FOR THE DATA OF PAGE 23-9(2-4)-
--3. THESE DATA ARE LESS COMPRESSIBLE AT ALL BUT THE HIGHEST PRESSURE

TABLE I



2-3 ..., ...-1
TEFLON (POLYTETRAFLUOROETHYLENE)

(F2-C-C-F2)N = (C2-F4)N

V0 = 0.4655 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHO0	US	UP	P	V/V0
2.148	5.150	1.960	217	.619
	4.372	1.513	142	.654
	3.800	1.176	96	.691

US =

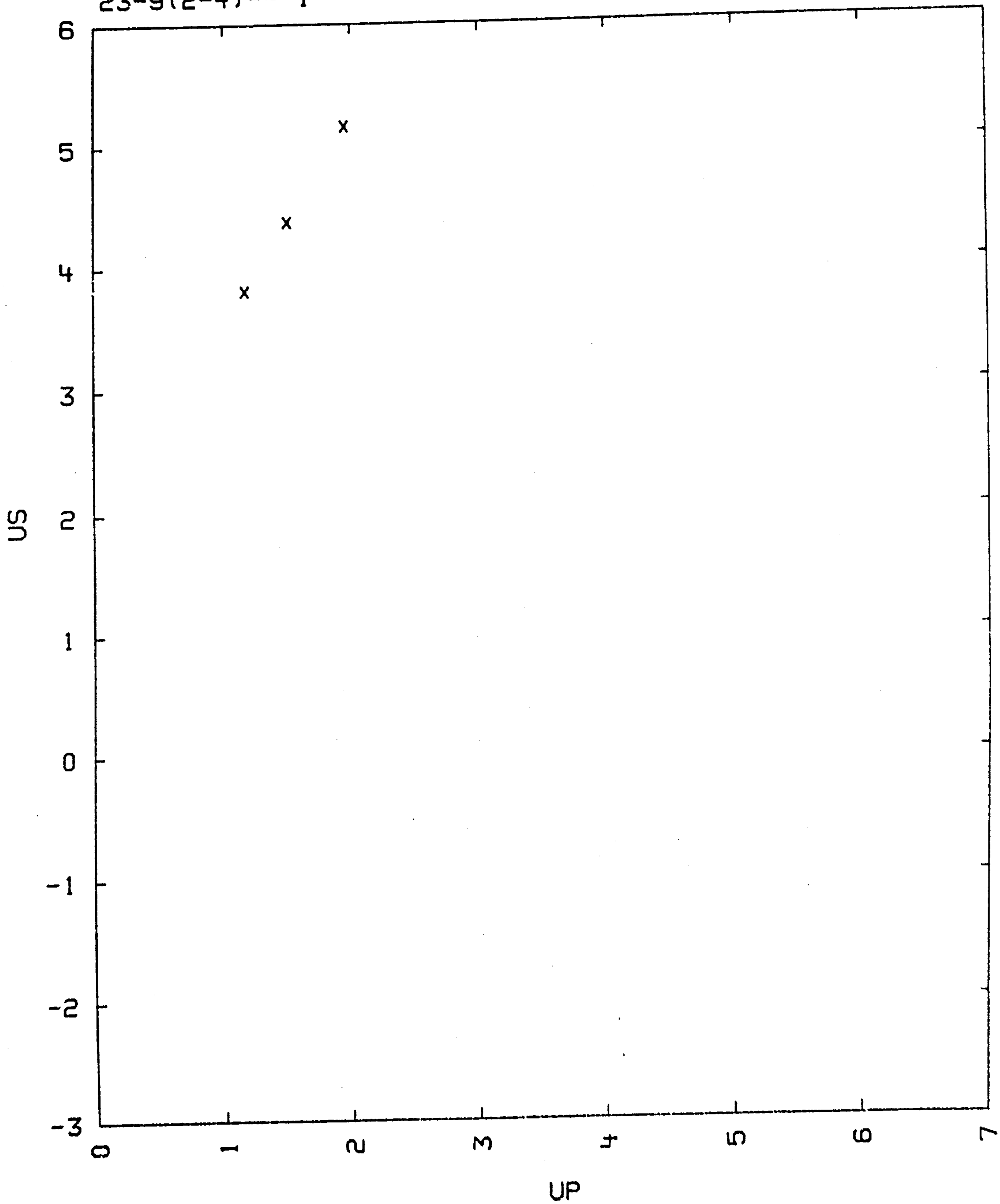
COMMENTS:

1) SOURCE: DEAL, W. E.
PRIVATE COMMUNICATION (1963)
LOS ALAMOS SCIENTIFIC LABORATORY, GMX-6, LOS ALAMOS, N. MEX.
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B

TABLE I

TEFLON (POLYTETRAFLUOROETHYLENE)

23-9(2-4)---1



23-9(2-4)---2
TEFLON (POLYTETRAFLUOROETHYLENE)

(F2-C-C-F2)N = (C2-F4)N

V0 = .463 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN MM/MICROSEC, AND PRESSURE IN KILOBARS. U IS THE VELOCITY OF THE PROJECTILE PLATE.

TABLE

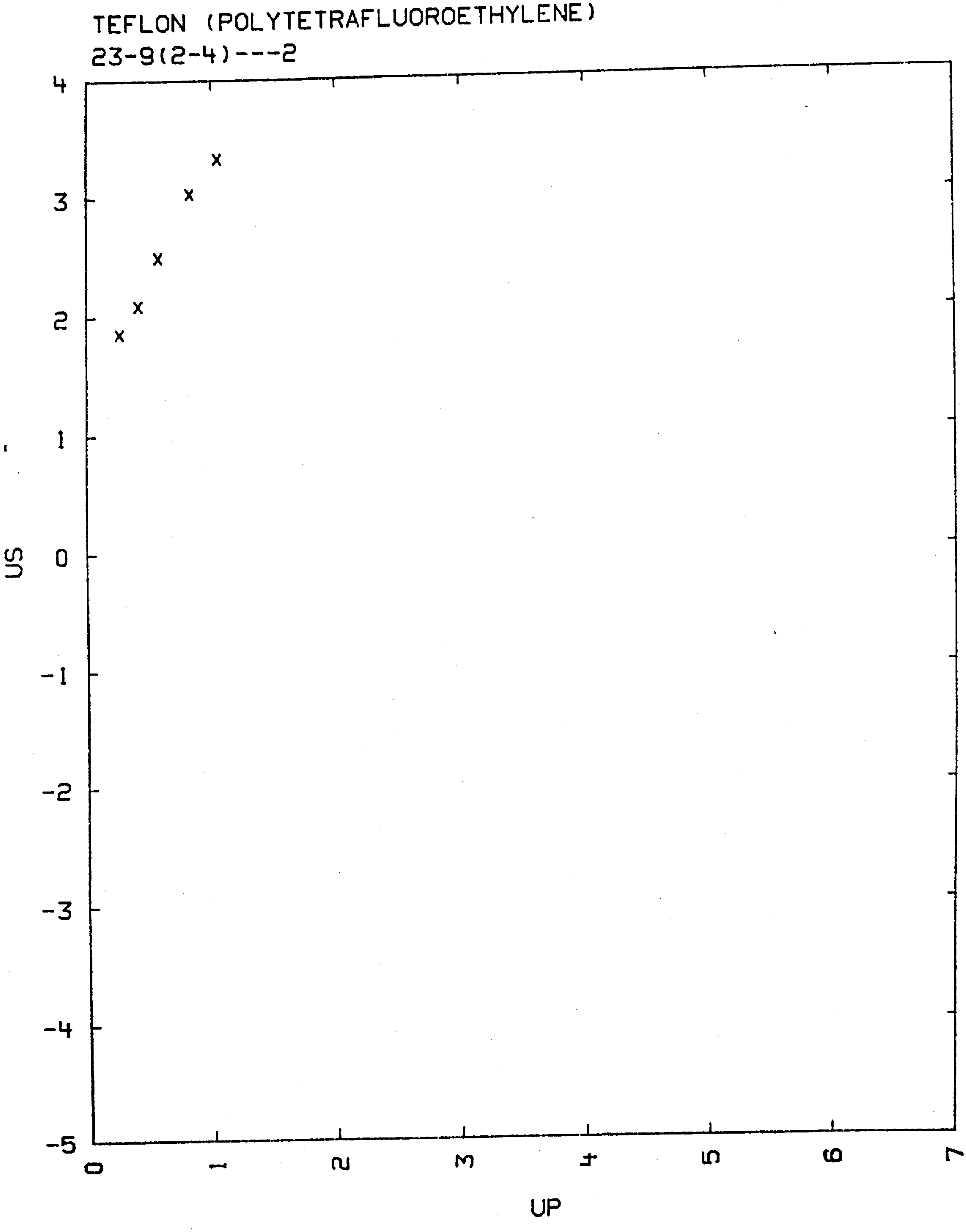
RHO0	US	UP	P	V/V0	U
2.16	1.85	.263	10.5	.8578	0.336
-	2.08	.410	18.4	.8029	0.536
-	2.49	.578	31.1	.7679	0.786
-	3.03	.837	54.8	.7238	1.19
-	3.32	1.06	76.4	.6808	1.54

US = 1.34 + 1.93 UP MM/MICROSEC.

COMMENTS:

1) SOURCE: WAGNER, M.H., WALDORF, W.F. AND LOUIE, N.A.
REPORT NO. AFSWC-TDR-62-66, VOL. 1
WORK DONE AT DOWNEY, CALIFORNIA.
2) EXPERIMENTAL TECHNIQUE: A DRIVER PLATE: 2024-T3 AL
DATA REDUCTION TECHNIQUE: A
3) ACCURACY IS LIMITED BECAUSE ASSEMBLY DIMENSIONS CAUSE DEVIATIONS FROM ONE DIMENSIONALITY.
4) THE 95 PERCENT CONFIDENCE LIMIT OF THE MEASURED VELOCITIES IN THE TABLE IS GIVEN IN ORDER OF THE LISTING BY THE UNCERTAINTIES:
+ OR - FDEL US = 16. 8.6 7.2 6.1 7.2 PERCENT
+ OR - FDEL U = 2.5 1.3 1.0 3.0 4.8 -
HERE FDEL U = 100(DEL U)/U

TABLE I


TEFLON (POLYTETRAFLUOROETHYLENE)
23-9(2-4)---2
US
UP
4
3
2
1
0
-1
-2
-3
-4
-5
0
1
2
3
4
5
6
7

23-9(2-4)---3
TEFLON (POLYTETRAFLUOROETHYLENE)

(F2-C-C-F2)N = (C2-F4)N

V0 = 0.446 CC/G

IN THE TABLE BELOW DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS.

TABLE

RHO0	US	UP	P	V/V0
2.24	3.92	1.02	89.6	0.740
-	3.93	1.03	90.7	0.736
-	4.03	1.04	93.9	0.742
-	4.41	1.27	125.5	0.712
-	4.60	1.33	137.0	0.711
-	4.87	1.50	163.6	0.692
-	4.97	1.49	165.9	0.700
-	5.18	1.69	196.1	0.674
-	5.44	1.89	230.3	0.653
-	5.46	1.83	223.8	0.665
-	5.56	1.96	244.1	0.648
-	5.79	2.08	269.8	0.641
-	5.93	2.24	297.5	0.622
-	6.25	2.43	340.2	0.611
-	6.60	2.73	403.6	0.586
-	7.24	3.19	517.4	0.559

US = 1.83 + 2.07 UP KM/SEC. FOR US BELOW 5 KM/SEC
SIG.US = 0.05
US = 2.92 + 1.353 UP KM/SEC FOR US ABOVE 5 KM/SEC
SIG.US = 0.04

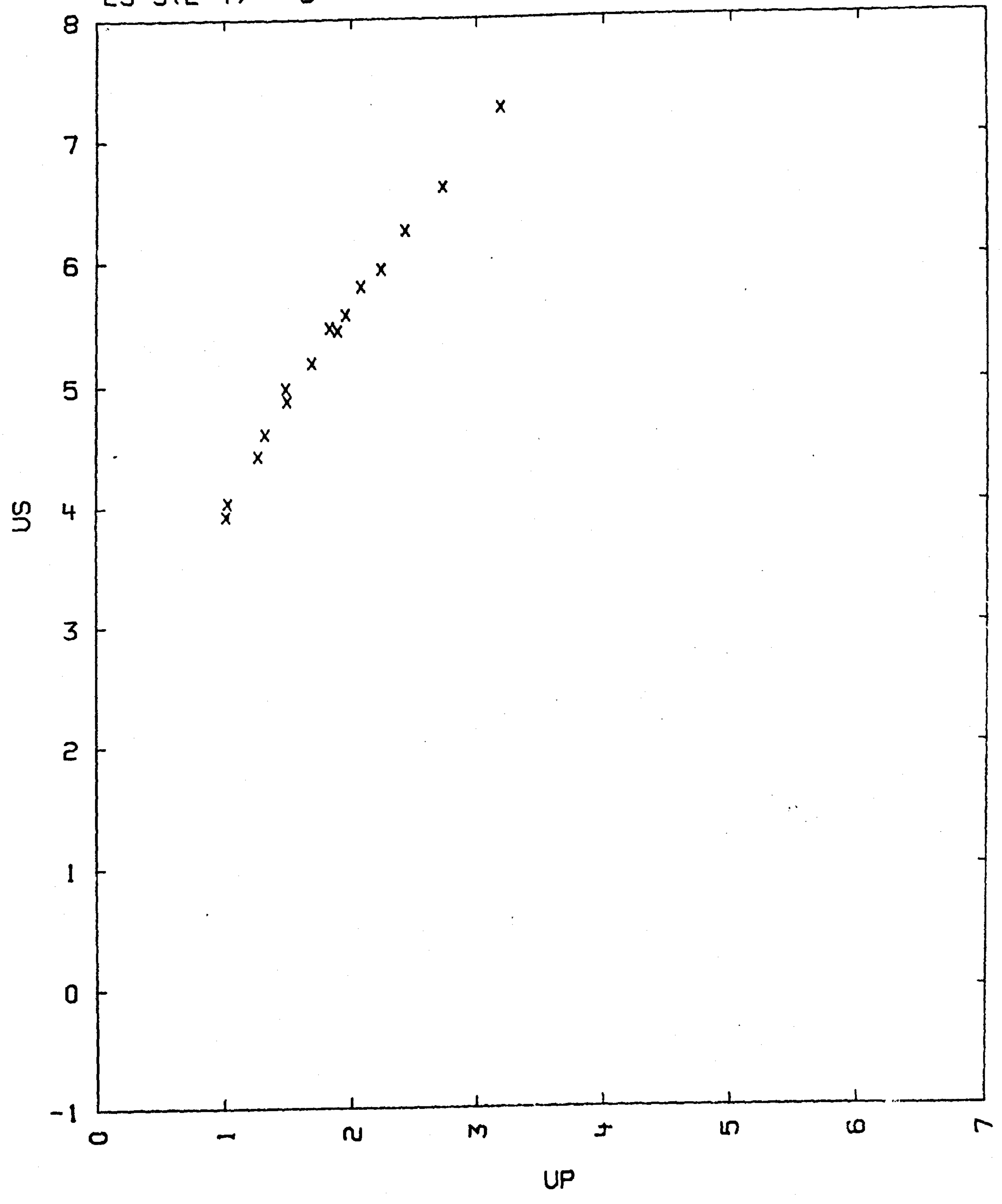
COMMENTS:

1) SOURCE: NETHERWOOD, P. H.
BRL MEMORANDUM REPORT NO. 1626 (DECEMBER, 1964)
U. S. ARMY BALLISTIC RESEARCH LABORATORIES
ABERDEEN PROVING GROUND, MARYLAND 21005
2) EXPERIMENTAL TECHNIQUE C1
DATA REDUCTION TECHNIQUE B
3) PLATES OF ALUMINUM, BRASS, AND MAGNESIUM WITH KNOWN EQUATIONS OF STATE WERE USED. THE ADIABATIC UNLOADING PATHS IN THE P VS. UP PLANE WERE REPRESENTED BY THE REFLECTION OF THE HUGONIOT, SLIGHTLY ADJUSTED TO PASS THROUGH THE POINT (UFS+2UP)/2. SEE HAUVER, G. E., AND MELANI, A., BRL REPORT NO. 1259, AUGUST 1964.
4) FURTHER WORK IS IN PROGRESS.

TABLE I

TEFLON (POLYTETRAFLUOROETHYLENE)

23-9(2-4)---3



23-9(2-4)---4
TEFLON (POLYTETRAFLUOROETHYLENE)

(-C(F2)-C(F2)-)N = (C2-F4)N

V0 = 0.4589-1.023 CC/G

THE TABLES LIST DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS. U(ST) DESIGNATES THE VELOCITY OF THE 1100 ALUMINUM PROJECTILE

TABLE I

RHOO	US	UP	P	V/V0	V(ST)
2.179	3.42	0.903	67.3	0.736	1.33
-	3.73	1.073	87.2	0.712	1.61
-	3.84	1.251	104.7	0.674	1.88
-	4.33	1.477	139.4	0.659	2.28
-	4.90	1.857	198.	0.621	2.93

US = 2.00 + 1.55*UP KM/SEC
SIGMA US = 0.074 KM/SEC

TABLE II

RHOO	US	UP	P	V/V0	U(ST)
1.535	2.99	1.274	58.5	0.574	1.65
-	3.10	1.249	59.4	0.597	1.63
-	3.24	1.237	61.5	0.618	1.63
-	3.52	1.498	80.9	0.575	2.00
-	3.86	1.724	102.2	0.553	2.34
-	4.10	2.101	132.3	0.488	2.87

US = 1.61 + 1.23 *UP KM/SEC
SIGMA US = 0.14 KM/SEC

TABLE III

RHOO	US	UP	P	V/V0	U(ST)
0.977	2.41	1.434	33.8	0.405	1.66
-	2.51	1.383	33.9	0.449	1.61
-	2.66	1.691	44.0	0.364	1.98
-	3.54	1.844	63.8	0.479	2.25
-	3.86	2.379	89.8	0.384	2.93

US = 3.38 + 1.52*UP KM/SEC
SIGMA US = 0.29 KM/SEC

COMMENTS

1) SOURCE: MORGAN D. T, ROCKOWITZ M., ATKINSON A. L.
AVCO CORP. REPORT NO. AFWL-TR-65-117
RESEARCH AND DEVELOPMENT DIVISION
AVCO CORP., WILMINGTON, MASS., USA

2) EXPERIMENTAL TECHNIQUE: (SEE 3)
DATA REDUCTION METHOD: B
THE STANDARD MATERIAL WAS 1100 AL ALLOY WITH
RHO0 =2.70 G/CC, US = C + S*UP KM/SEC
C = 5.144 +OR-0.093 KM/SEC
S = 1.528 +OR-0.041

3) THE PRESSURE WAS GENERATED WITH ALUMINUM 1100 ALLOY PROJECTILES
THE PROJECTILE VELOCITY AND SAMPLE SURFACE MOTION WERE DETECTED BY REFLECTING A LASER BEAM OFF THESE SURFACES AND OBSERVING THE LIGHT PHOTOMETRICALLY THROUGH A SET OF SLITS. THESE MEASUREMENTS TOGETHER WITH THE OBSERVATION OF AN IMPACT FLASH GENERATED WHEN THE PROJECTILE AND SAMPLE COLLIDE, YIELD US AND U(ST)

4) ACCURACY OF THE VELOCITY MEASUREMENTS WAS TYPICALLY 1 PERCENT

TABLE I

TEFLON (POLYTETRAFLUOROETHYLENE)

23-9(2-4)---4

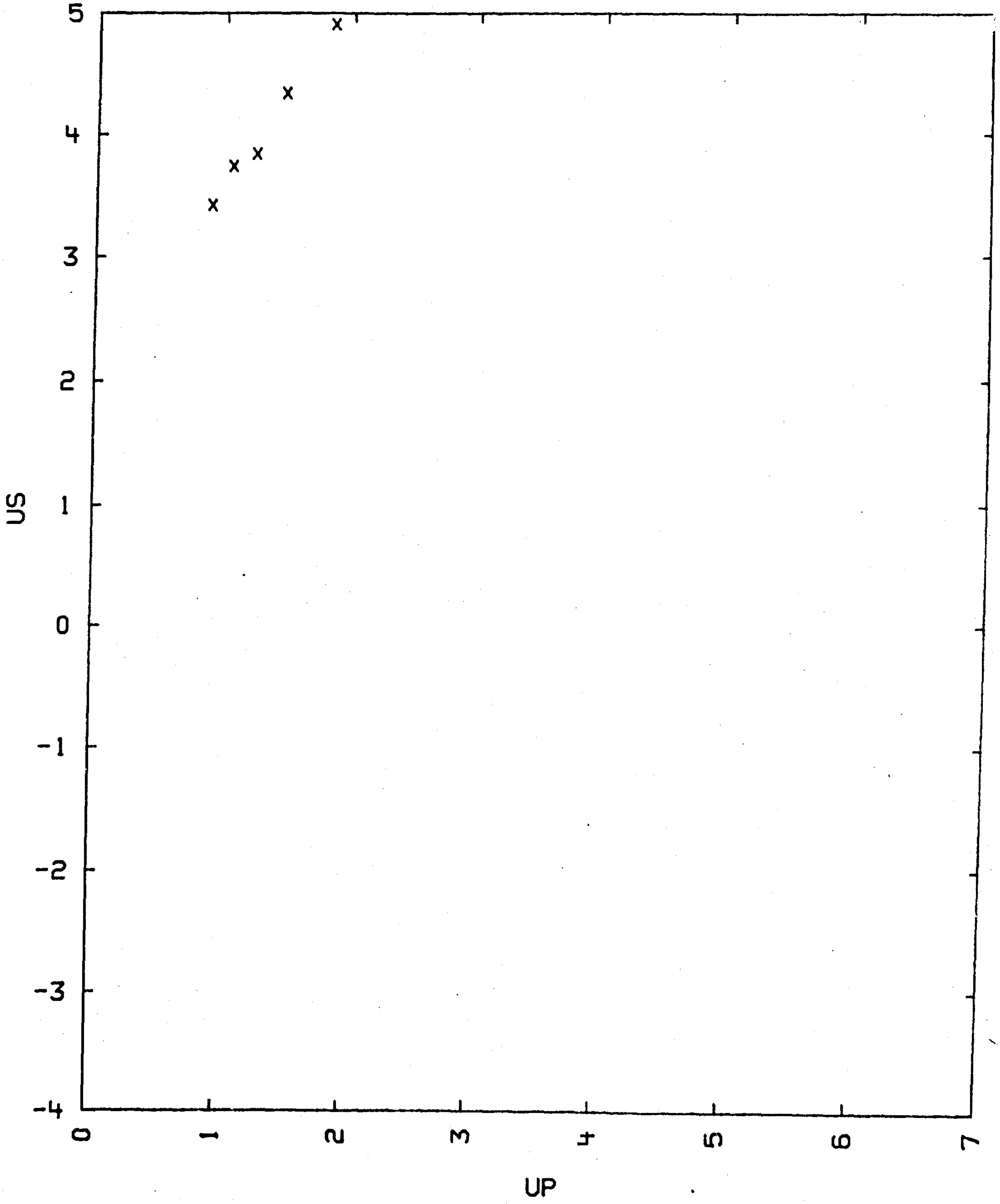


TABLE II

TEFLON (POLYTETRAFLUOROETHYLENE)

23-9(2-4)---4

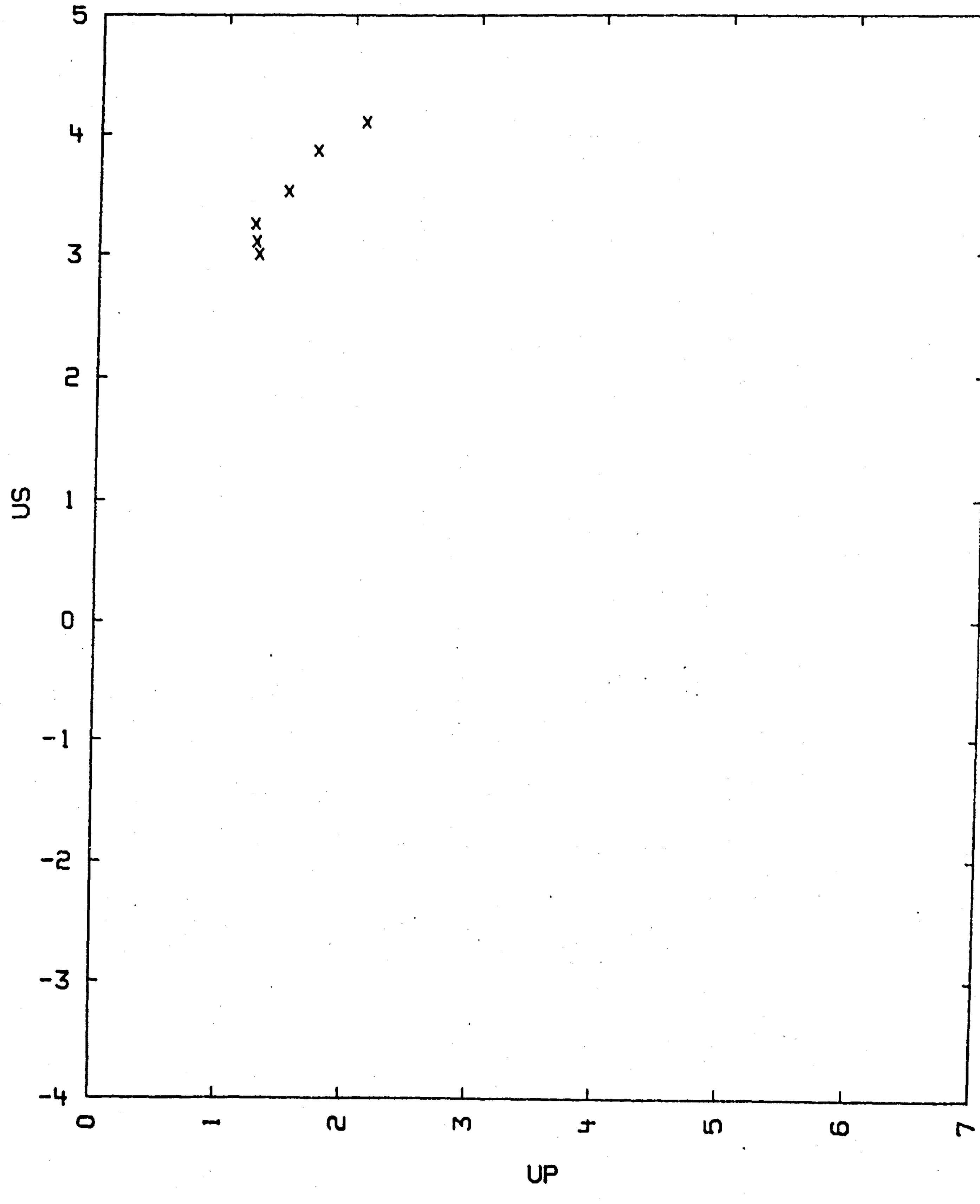
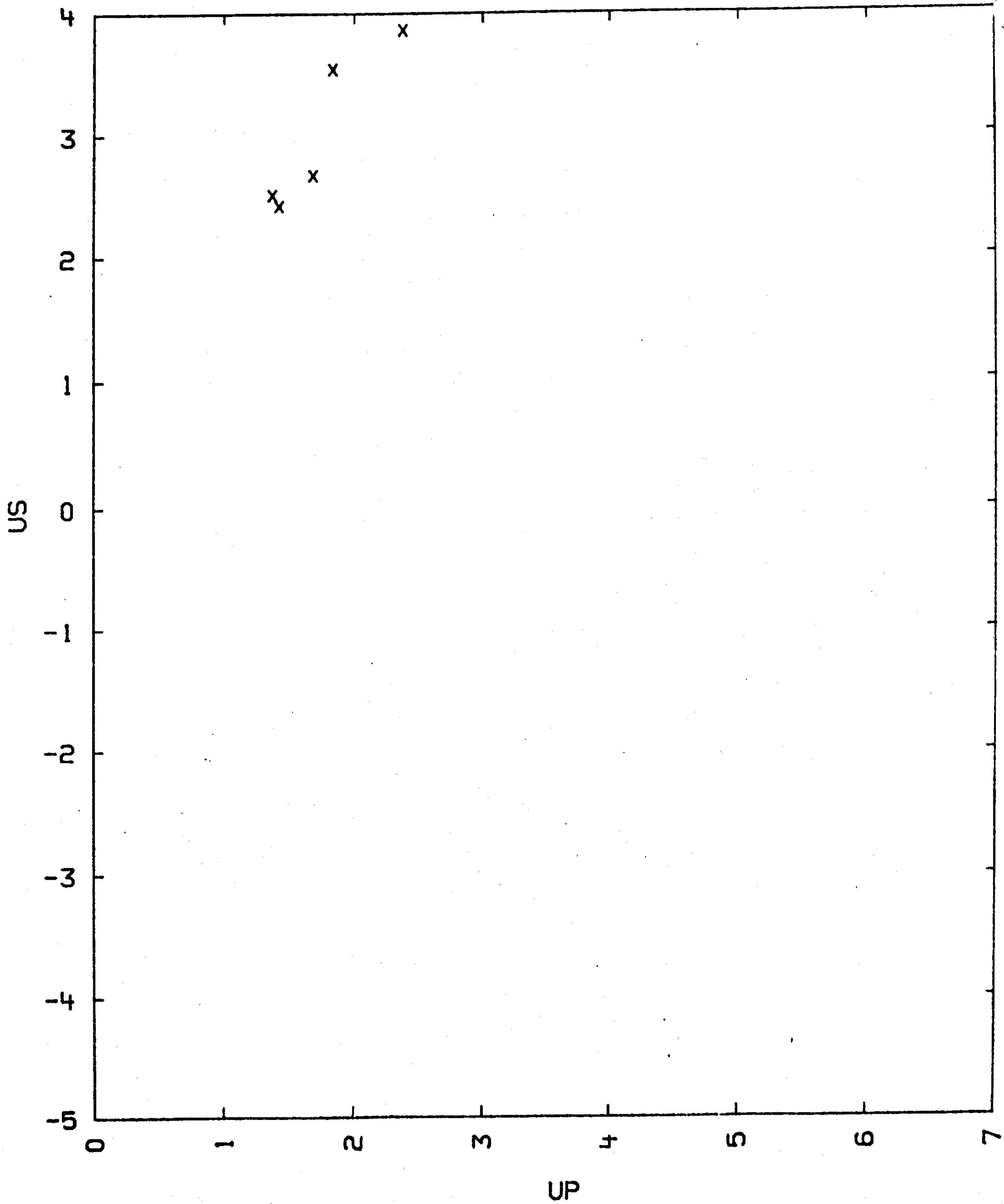


TABLE III

TEFLON (POLYTETRAFLUOROETHYLENE)

23-9(2-4)---4



23-9(2-4)---5
TEFLON (POLYTETRAFLUOROETHYLENE)

(-C(F2)-C(F2)-)N = (C2-F4)N
PARTICLE SIZE OF POROUS SAMPLES: SEE COMMENTS

V0 = 0.4604 - 1.285 CC/G

THE TABLES LIST DENSITY IN G/CC, VELOCITIES IN KM/SEC AND P IN KILOBARS

TABLE I

RHO0	US	UP	P	V/V0
0.7967	2.048	1.420	23.0	0.3066
0.7606	3.741	2.493	71.0	0.3336
0.7828	4.374	2.985	103.0	0.3175
0.7782	4.340	2.980	100.8	0.3134
0.7870	5.129	3.600	146.0	0.2981
0.7782	5.646	3.985	175.5	0.2941
0.7828	6.086	4.335	207.0	0.2877
0.7869	6.419	4.565	231.0	0.2888

US = -0.26 + 1.72*UP - 0.060*UP**2 KM/SEC
SIG US = 0.047 KM/SEC

TABLE II

RHO0	US	UP	P	V/V0
1.533	2.639	1.255	50.5	0.5244
1.524	4.354	2.120	140.5	0.5131
1.517	4.909	2.555	190.3	0.4795
1.525	4.952	2.535	191.5	0.4881
1.516	5.774	3.065	268.0	0.4692
1.524	6.207	3.373	319.0	0.4564
1.517	6.683	3.66	371.0	0.4522
1.516	6.992	3.855	408.5	0.4486

US = 0.14 + 2.14*UP - 0.096*UP**2. KM/SEC.
SIG US = 0.07 KM/SEC.

TABLE III

- - - - - - - SAMPLE	- - - - - - - -					- - BULLET -	
RHO0	US	UP	P	PG	V/V0	MAT	U
2.175	1.92	0.208	8.7	8.4	0.892	TEFLON	0.417
2.175	2.00	0.247	10.8	9.0	0.876	AL	0.311

TEFLON (POLYTETRAFLUOROETHYLENE)

RHOO	US	UP	P	PG	V/VO	MAT	U
2.171	2.17	0.370	17.6	15.8	0.830	TEFLON	0.741
2.170	2.67	0.578	33.5	32.0	0.784	AL	0.781
2.157	3.529	1.075	82.0		0.6954		
2.168	5.120	1.835	203.0		0.6416		
2.169	5.589	2.215	269.0		0.6037		
2.175	5.628	2.205	269.5		0.6082		
2.170	5.994	2.415	314.0		0.5971		
2.169	6.360	2.665	368.0		0.5810		
2.163	6.830	2.945	435.0		0.5688		
2.172	7.105	3.080	476.0		0.5665		
2.163	7.262	3.200	504.0		0.5593		
2.169	7.543	3.375	552.5		0.5526		

US = 1.477 + 2.053*UP -0.077*UP**2. KM/SEC
SIG US = 0.06 KM/SEC.

COMMENTS

1) SOURCE: ANDERSON G. D., DORAN D. G. AND FAHRENBRUCH A. L.
AIR FORCE WEAPONS LAB. REPORT AFWL-TR-65-147 (1965)
- - - - - AFWL-TR-67-43
STANFORD RES. INST., MENLO PARK, CALIFORNIA, USA.
2) EXPERIMENTAL METHOD: C
DATA REDUCTION TECHNIQUE: B
STANDARD MATERIAL 2024 AL ALLOY
3) THE POROUS SAMPLES IN TABLES II AND III WERE PREPARED BY PRESSING TOGETHER A MIXTURE OF DUPONTS TEFLON 7 POWDER (AVERAGE PARTICLE SIZE 35 MICRONS AND RHO = 0.25 G/CC) AND AN APPROPRIATE AMOUNT OF LEACHABLE SALT. THE MIXTURE WAS PRESSED TO 200 ATMOSPHERE:, SINTERED AT 22 DEG CENTIGRADE AND LEACHED FROM 11 TO 19 DAYS.
D.T. MORGAN, M. ROCKOWITZ AND A. L. ATKINSON
REPORT NUMBER: AFWL-TR-65-117 (1965)
RES. AND DEVELOPMENT DIV., AVCO CORP., WILMINGTON, MASS., USA.

TABLE I

TEFLON (POLYTETRAFLUOROETHYLENE)

23-9(2-4)---5

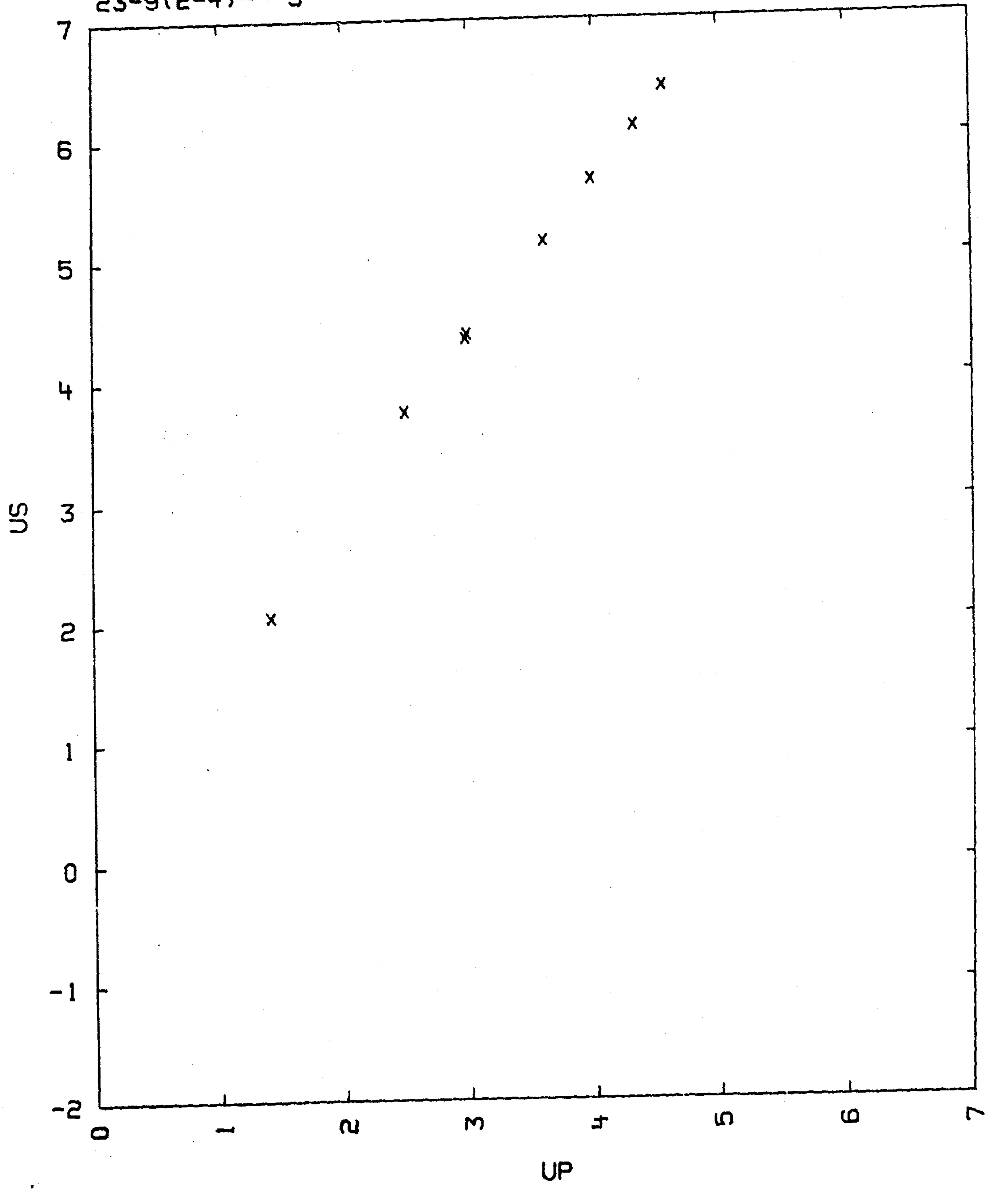


TABLE II

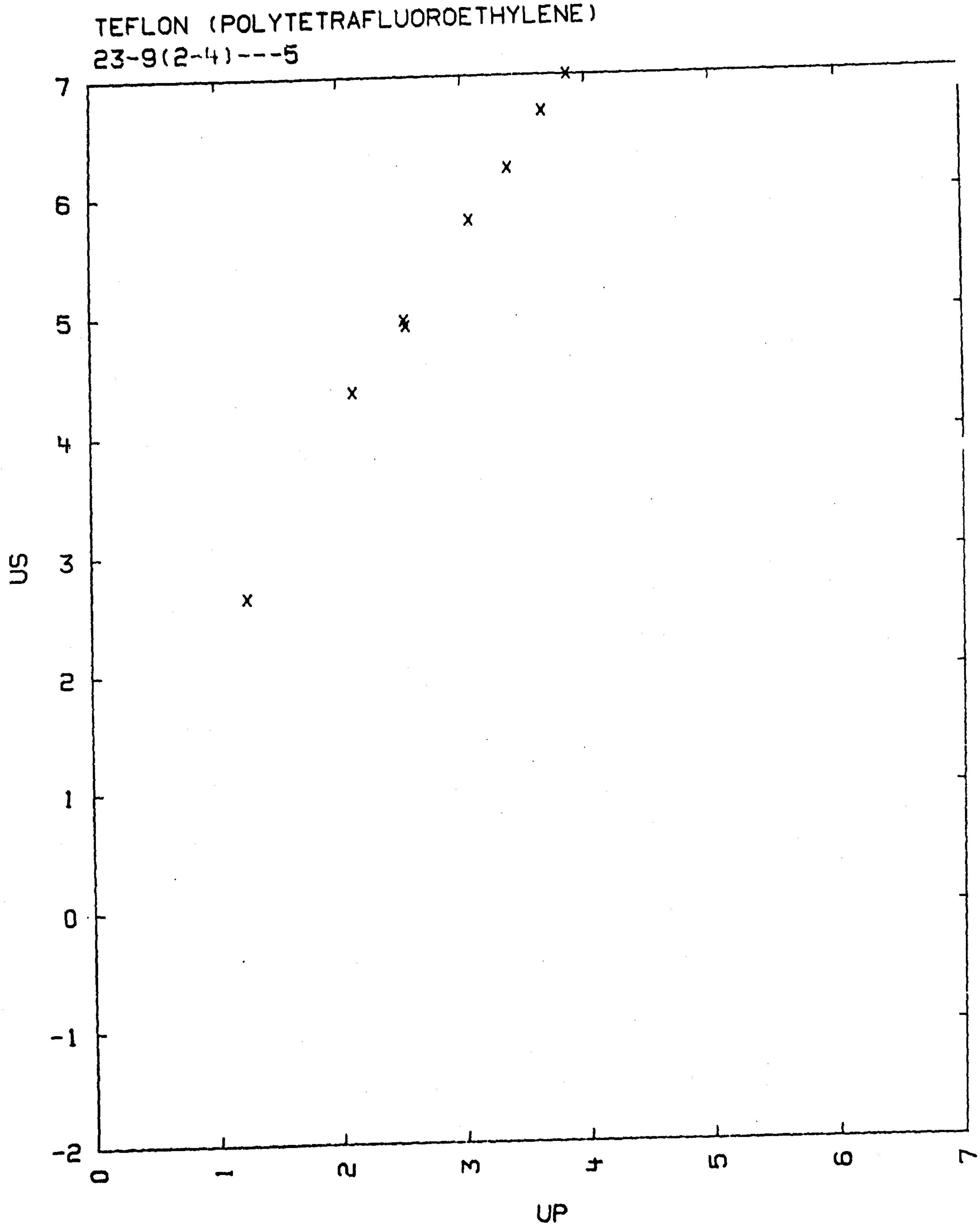
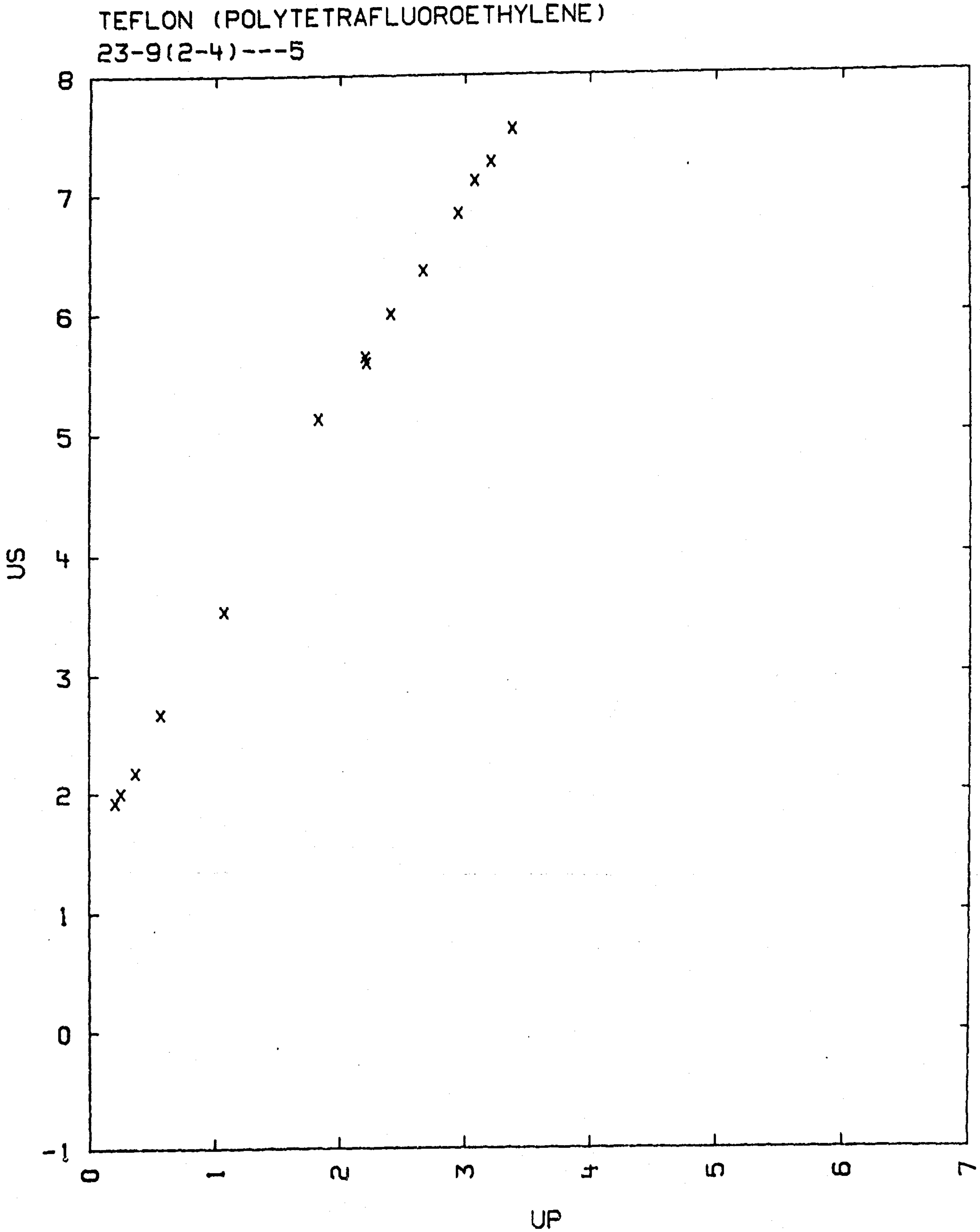

TEFLON (POLYTETRAFLUOROETHYLENE)
23-9(2-4)---5
US
UP
7
6
5
4
3
2
1
0
-1
-2
0
1
2
3
4
5
6
7

TABLE III


TEFLON (POLYTETRAFLUOROETHYLENE)
23-9(2-4)---5
US
UP
8
7
6
5
4
3
2
1
0
-1
0
1
2
3
4
5
6
7

?3-9(2-4) -- 8
TEFLON

POLYTETRAFLUOROETHYLENE (F2-C-C-F2)N

V0 = 0.465 C0 = 1.14 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
2.152	2.89	0.66	41.	0.7716	2024 AL	5.94
2.152	3.25	0.85	59.	0.7385	2024 AL	6.14
2.152	3.71	1.09	87.	0.7062	CU	4.92
2.147	3.75	1.13	91.	0.6987	2024 AL	6.45
2.152	3.91	1.20	101.	0.6931	2024 AL	6.53
2.147	4.32	1.47	136.	0.6597	2024 AL	6.82
2.152	4.51	1.54	149.	0.6585	2024 AL	6.91
2.152	4.64	1.69	169.	0.6358	CU	5.50
2.147	5.15	1.89	209.	0.6330	2024 AL	7.33
2.152	5.43	2.07	242.	0.6188	2024 AL	7.54
2.152	5.77	2.32	288.	0.5979	CU	6.15
2.152	5.99	2.41	311.	0.5977	2024 AL	7.95
2.152	6.38	2.61	358.	0.5909	CU	6.46
2.152	6.65	2.75	394.	0.5865	2024 AL	8.38
2.152	6.72	2.90	419.	0.5685	CU	6.75
2.152	7.08	3.06	466.	0.5678	2024 AL	8.76
2.152	7.38	3.26	518.	0.5583	CU	7.13
2.152	7.62	3.38	554.	0.5564	2024 AL	9.16
2.152	8.13	3.53	618.	0.5658	2024 AL	9.39
2.152	7.85	3.56	601.	0.5465	CU	7.45
2.152	8.00	3.71	639.	0.5362	CU	7.60
2.151	8.04	3.75	649.	0.5336	CU	7.64
2.152	8.39	3.82	690.	0.5447	2024 AL	9.72
2.152	8.95	4.39	846.	0.5095	2024 AL	10.39

US = 1.682 + 1.819*UP KM/SEC FOR UP BELOW 3.5 KM/SEC
SIG US 0.08 KM/SEC
US = 3.47 + 1.25*UP KM/SEC FOR UP ABOVE 3.74 KM/SEC
SIG US = 0.18 KM/SEC

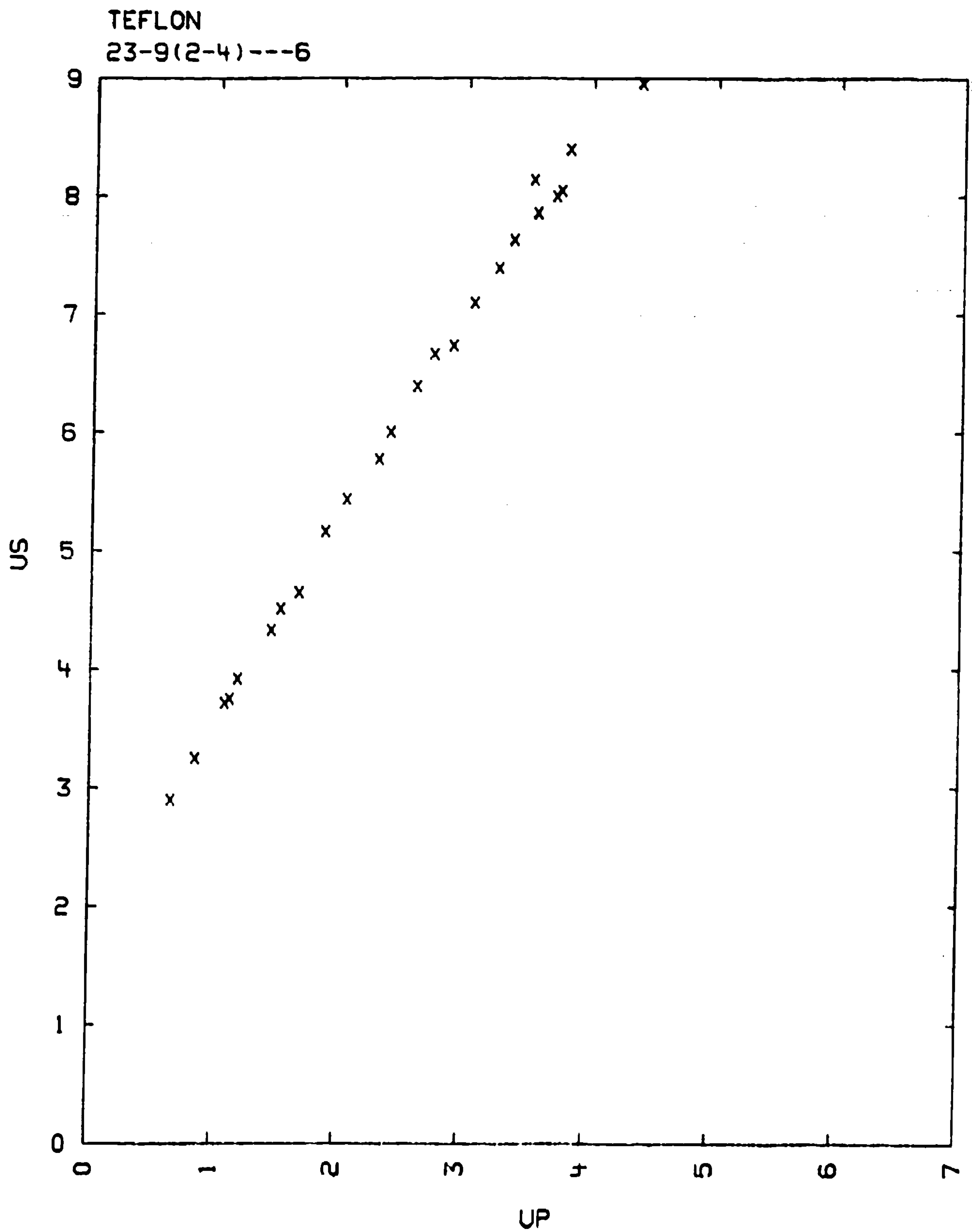
COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B

DATA REDUCTION TECHNIQUE: B

3) V(DP/DE) = 0.59

TABLE I



23-10-2(4-1-5)---1
NEOPRENE (POLY-2CHLORO-1,3 BUTADIENE)

(-C(H2)-C(H):C(CL)-C(H2)-)N

VO = 0.6949 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

----SAMPLE----					----STANDARD----	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
1.439	4.37	1.14	72.	0.7391	2024 AL	6.38
1.438	5.01	1.53	110.	0.6946	2024 AL	6.78
1.439	5.72	2.08	171.	0.6364	2024 AL	7.34
1.440	5.76	2.09	173.	0.6372	2024 AL	7.36
1.439	5.74	2.10	173.	0.6341	2024 AL	7.36

US = 2.785 + 1.419*UP KM/SEC
SIGMA US = 0.041 KM/SEC

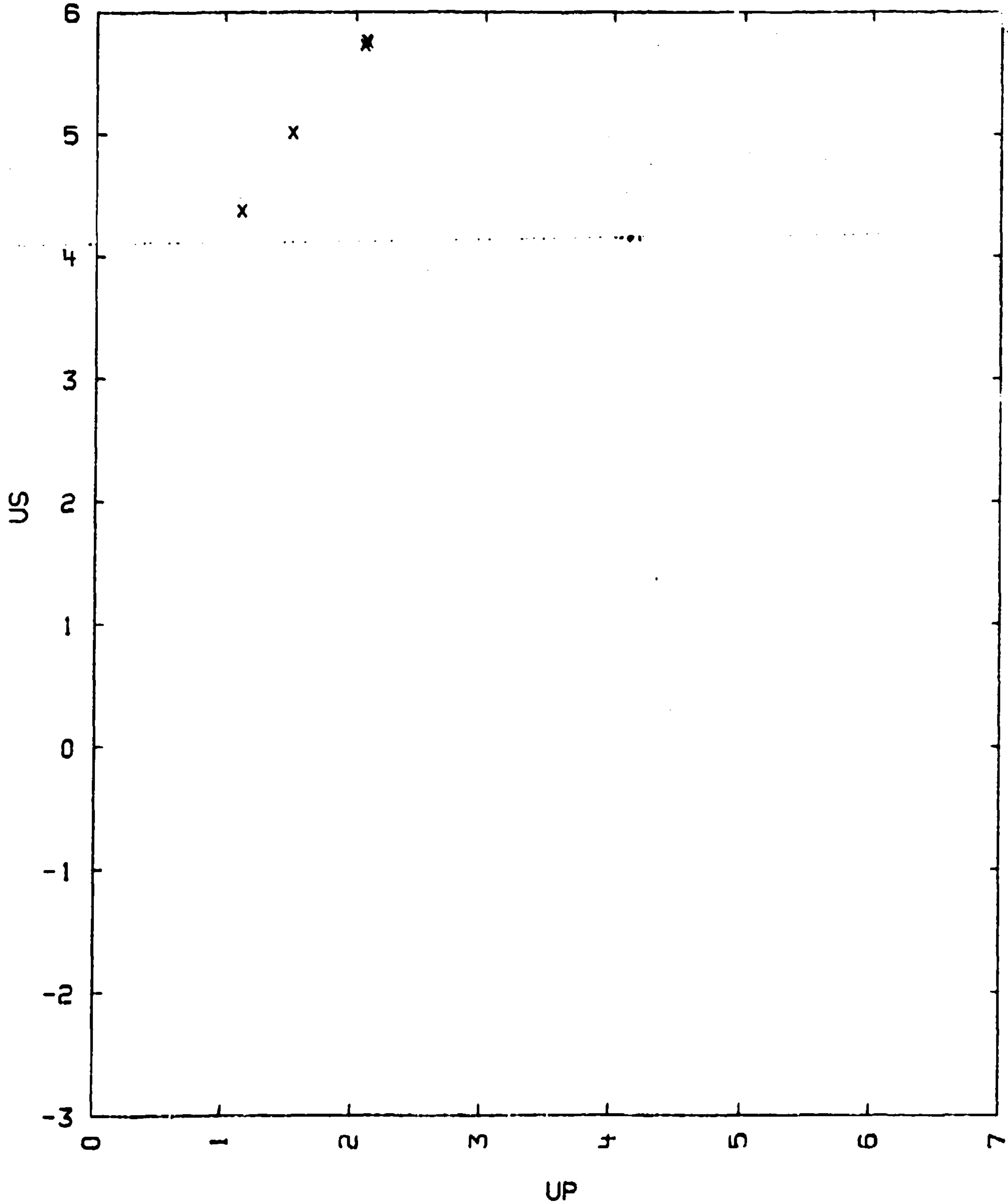
COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE:B
DATA REDUCTION TECHNIQUE:B (STANDARD BASE PLATE AS SHOWN)

TABLE I

NEOPRENE (POLY-2CHLORO-1,3 BUTADIENE)

23-10-2(4-1-5)---1



23-10-9(2-1-3)---1
KEL F (POLYTRIFLUOROCHLOROETHYLENE)

(CL-C(F)-C-F2)N = (C2-CL-F3)N

V0 = .48 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHO0	US	UP	P	V/V0
2.10	2.60	0.580	31.7	0.7770
-	2.68	0.565	31.9	0.7892
-	3.61	1.10	83.1	0.6953
-	3.64	1.27	96.8	0.6511

US = 1.73 + 1.61 KM/SEC, SIG.US = 0.13 KM/SEC.

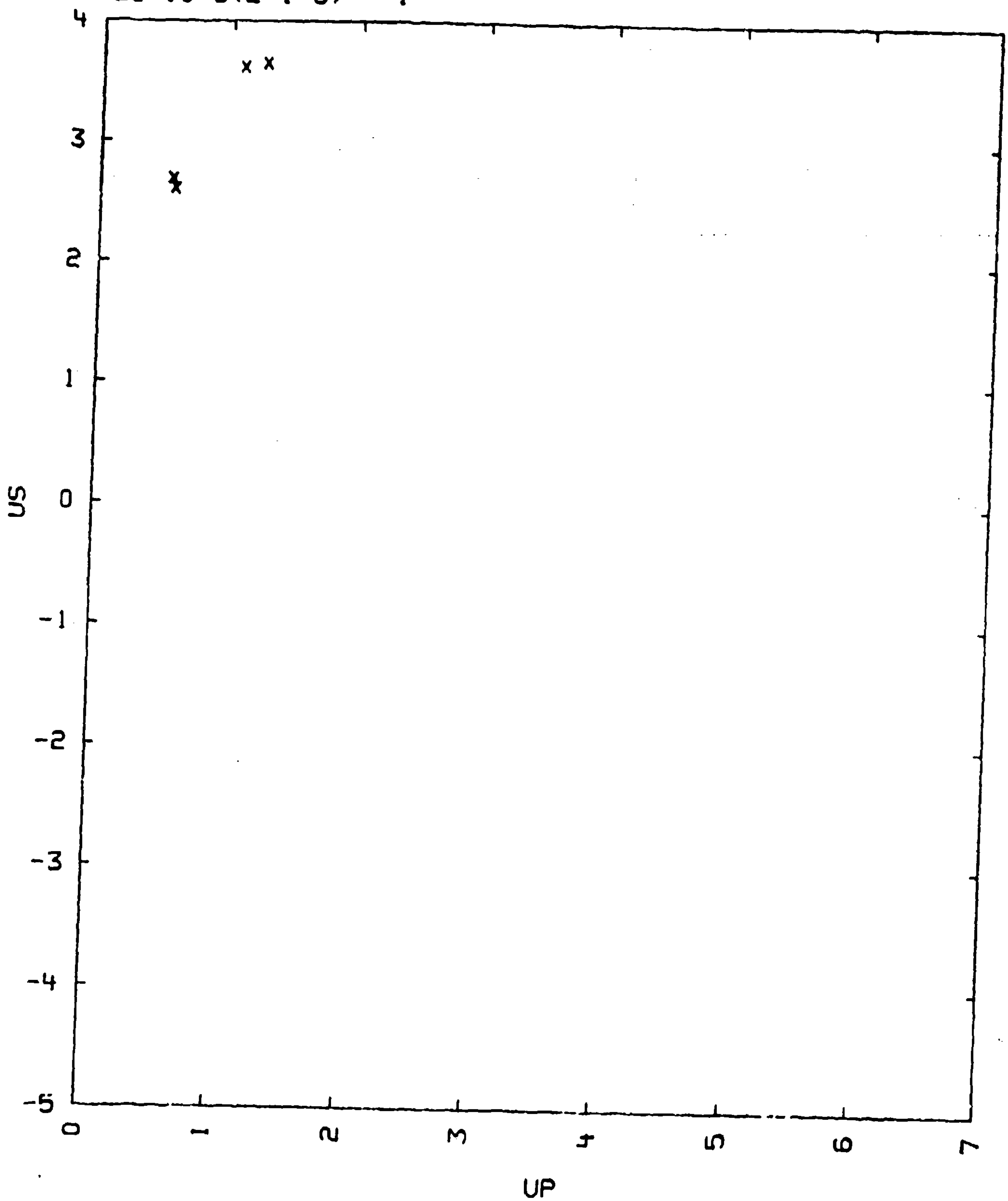
COMMENTS:

1) SOURCE: WAGNER, M.H., WALDORF, W.F. AND LOUIE, N.A.
REPORT NO. AFSWC-TDR-62-66, VOL. 1 (1962)
WORK DONE AT DOWNEY, CALIFORNIA.
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE D
IN THE TABLE UP = (1/2)UFS
3) ACCURACY IS LIMITED BECAUSE ASSEMBLY DIMENSIONS ALLOW RELATIVELY LARGE DEVIATION FROM ONE-DIMENSIONALITY.

TABLE I

KEL F (POLYTRIFLUOROCHLOROETHYLENE)

23-10-9(2-1-3)---1



23-10-9(12-8-18)---1
POLYTRIFLUOROCHLOROETHYLENE (HALOFLUOROCARBON OIL)

CL-(C-F2-C(F)-CL)6-CL = F18-CL8-C12

T0 = 15-30 DEG. C
V0 = 0.506 - 0.513 CC/G   C0 = 0.95 KM/SEC

IN THE TABLE BELOW, TEMPERATURE (T) IS GIVEN IN DEGREES CENTIGRADE, DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

T	RHO0	US	UP	P	V/V0
30	1.948	4.814	1.86	175	0.613
30	1.948	3.500	1.07	72.5	0.694
20	1.965	4.779	1.89	178	0.604
15	1.975	3.108	0.875	54	0.718

US = 1.69 + 1.66*UP KM/SEC   SIGMA US = 0.05 KM/SEC

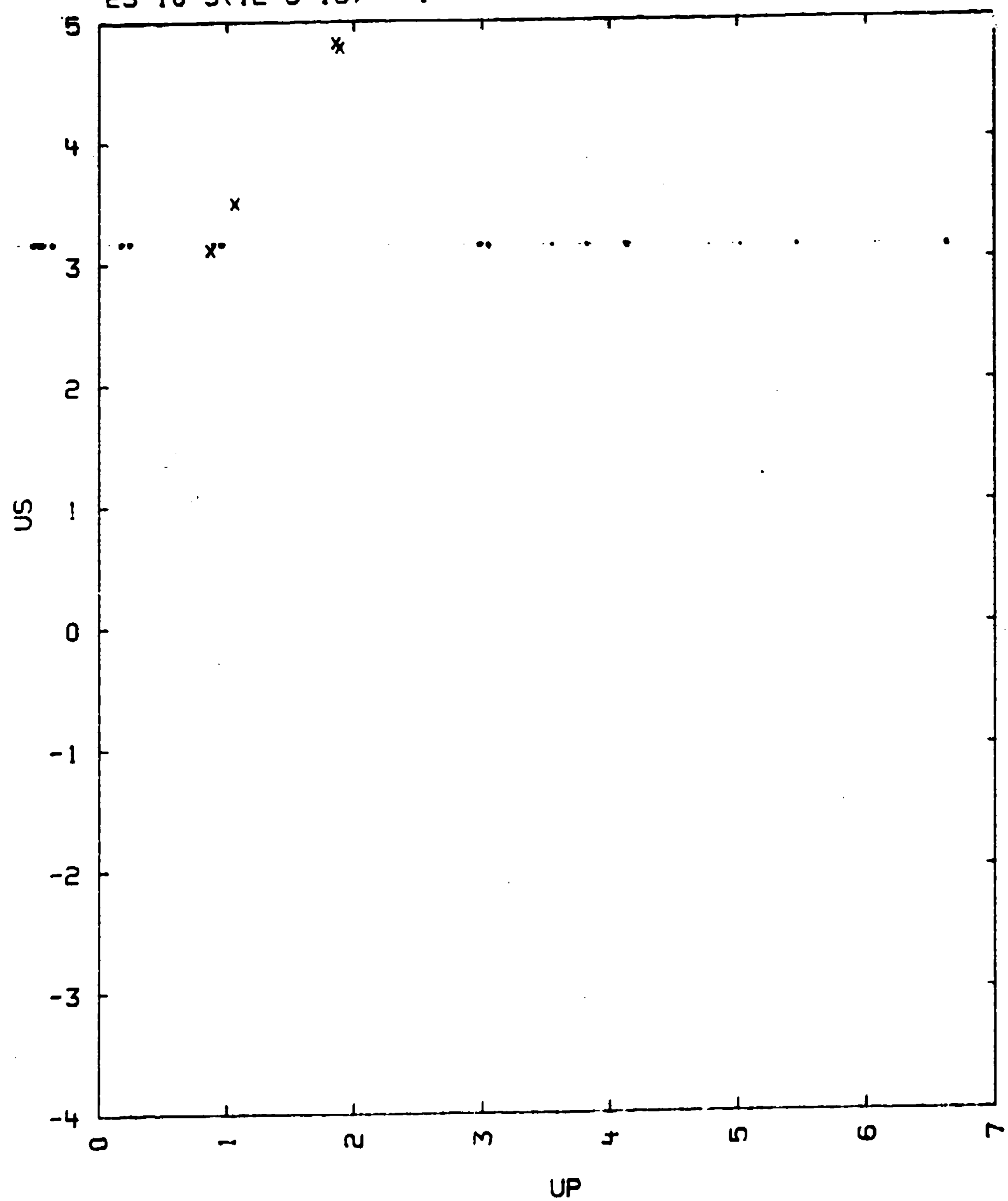
COMMENTS:

1) SOURCE: RAMSAY, J. B.
PRIVATE COMMUNICATION (1967)
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL ALUMINUM 2024.
3) THE MOLECULAR WEIGHT OF THIS POLYMER IS ABOUT 780 G.
4) C0 IS A ESTIMATED VALUE. BECAUSE OF HIGH ATTENUATION OF SOUND IN THE SAMPLE IT WAS NOT POSSIBLE TO MEASURE THE SOUND SPEED WITH THE USUAL PRECISION.

TABLE I

POLYTRIFLUOROCHLOROETHYLENE (HALOFLUOROCARBON OIL)

23-10-9(12-8-18)---1



23-11-2(1-1-3)---1
BROMOFORM

C-H-BR3	85 TO 95 PERCENT (ESTIMATED)
DECOMPOSITION PRODUCTS	REMAINDER

TO = 17-36 DEG. C   CO = 0.93 KM/SEC
VO = 0.356- 0.348 CC/G

IN THE TABLE, TEMPERATURE (T) IS GIVEN IN DEGREES CENTIGRADE, DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS. M DENOTES THE SAMPLE MATERIAL (SEE COMMENT 4).

TABLE

T	RHOO	US	UP	P	V/VO	M
23	2.87	2.02	0.67	33	0.667	D
36	2.85	4.00	1.83	205	0.545	C
20	2.81	3.95	1.79	198	0.547	A
18	2.81	2.88	1.09	88	0.622	A
19	2.81	1.87	0.60	31	0.679	A
17	2.81	2.86	1.07	86	0.625	A
20	2.876	3.45	1.36	136	0.606	B
25	2.87	4.17	1.97	235	0.528	B
25	2.87	1.75	0.56	28	4.677	C
26	2.87	3.42	1.42	140	0.583	C
26	2.87	3.48	1.41	140	0.594	C
27	2.87	3.47	1.41	141	0.594	C

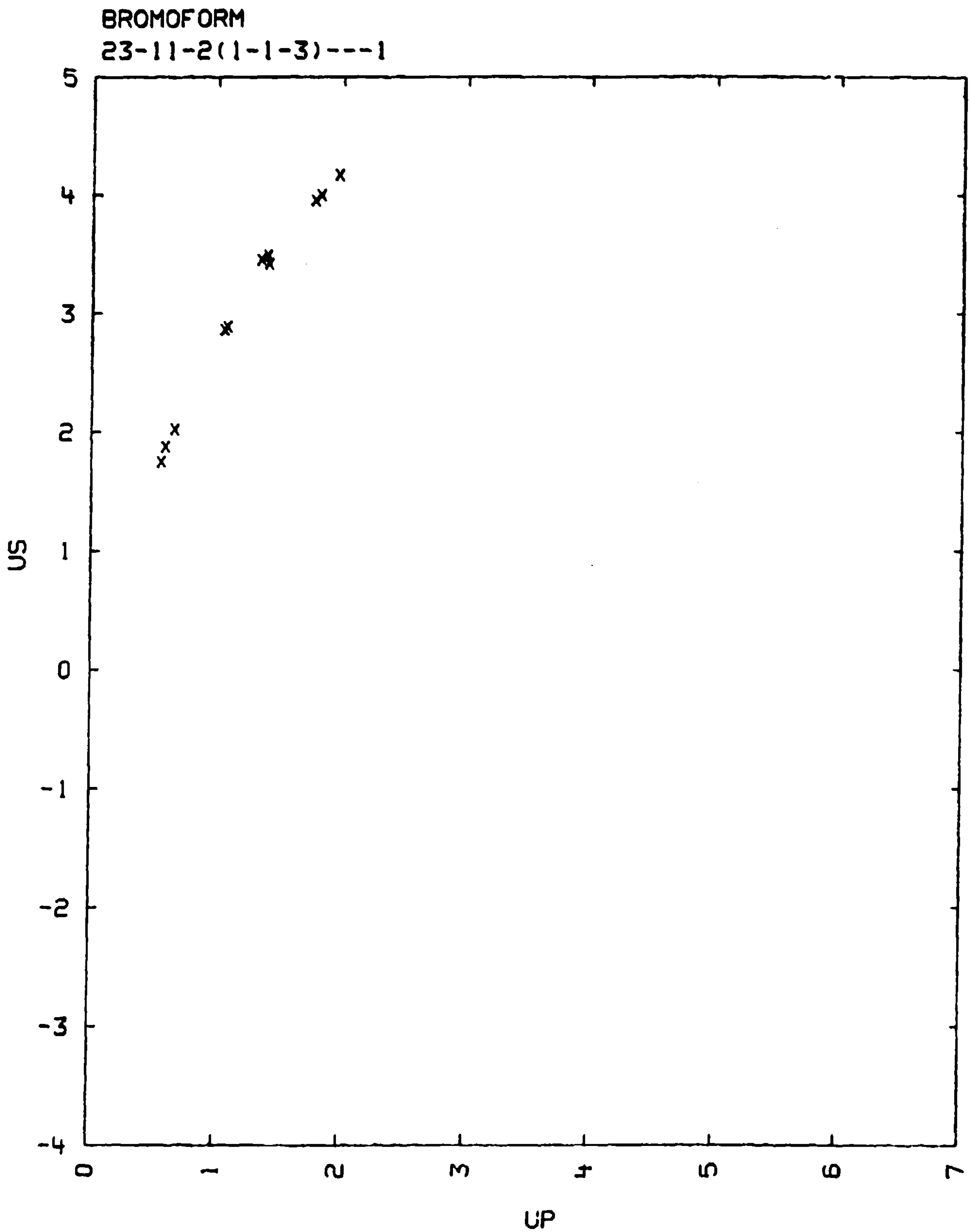
US = 0.210 + 3.061*UP + 0.433(2.876-RHOO) - 0.663(2.876-RHOO)UP - 0.53 (2.876-RHOO)UP**2 KM/SEC   SIGMA US = 0.04 KM/SEC

COMMENTS:

1) SOURCE: RAMSAY, J. B.
REPORTS NO. GMX-8-MR-62-6 AND GMX-8-MR-62-7 (1962)
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE : FOR THE FIRST ENTRY,TECHNIQUE E WAS USED. FOR ALL OTHER DATA POINTS TECHNIQUE B WAS USED.
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL ALUMINUM 2024
3) ABSORBTION OF VISIBLE LIGHT AFTER ENTRY OF SHOCK INTO THE SAMPLE SUGGESTS DECOMPOSITION.
4) THE SAMPLE MATERIALS USED ARE LISTED BELOW:
A) PURITY NOT SPECIFIED, EASTMAN CHEMICAL CO., KINGSPORT, TENNESSEE USA.
B) STABILIZED WITH DIPHENYLAMINE, EASTMAN CHEMICAL CO., KINGSPORT, TENNESSEE, USA.
C) PRACTICAL GRADE, EASTMAN CHEMICAL CO., KINGSPORT, TENNESSEE, USA
D) PURITY NOT SPECIFIED, MATHESON, COLEMAN, AND BELL, EAST RUTHERFORD, NEW JERSEY, USA.
THE ABOVE VALUE OF PURITY WAS ESTIMATED. NO CHEMICAL ANALYSIS ON THE

EXTENT OF DECOMPOSITION OF THIS LIGHT SENSITIVE MATERIAL HAS BEEN MADE.

TABLE 1



23-11-2(2-5-1)---1
BROMOETHANE

H3-C-C(BR)H2 = C2-H5-BR

T0 = 16-19 DEG. CENTIGRADE
V0 = 0.682-0.685 CC/G. C0(20 DEG.C) = 1.009 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC., PRESSURE IN KILOBARS, DENSITY IN G/CC. AND TEMPERATURE IN DEG. CENTIGRADE

TABLE

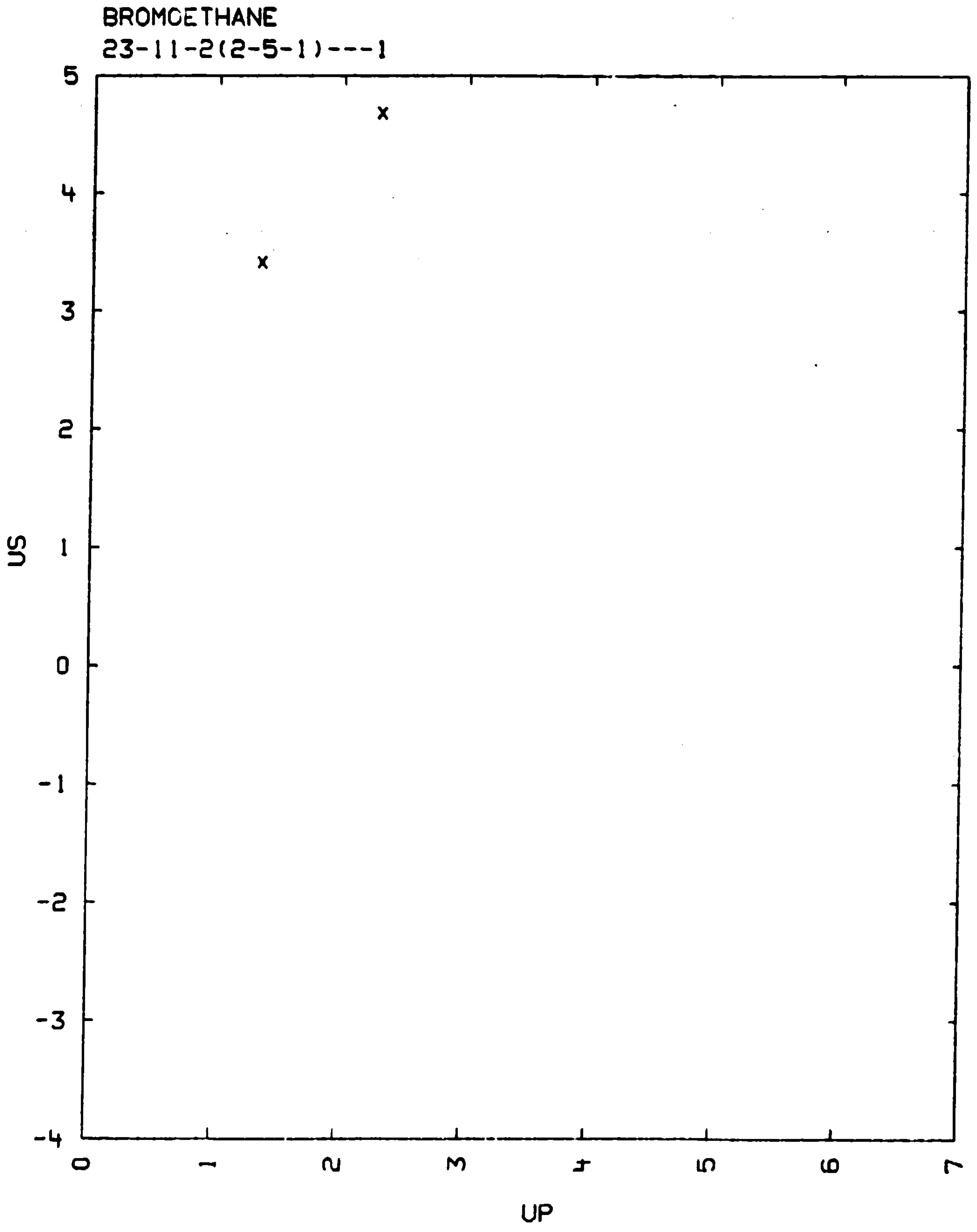
T0	RHO0	US	UP	P	V/V0
19	1.460	4.68	2.300	157.1	0.508
16	1.466	3.40	1.363	68.0	0.599

US =

COMMENTS:

1) SOURCE: WALSH J. M. AND RICE M. H.
JOURNAL OF CHEMICAL PHYSICS, VOL. 26, P. 815 (1957)
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL 24ST ALUMINUM
3) C0 WAS OBTAINED FROM L. BERGMANN,DER ULTRASCHALL (S HIRZEL VERLAG, STUTTGART, 1954) 6TH ED., P. 375

TABLE I



23-18-2-1(1-1-3-3)---1
NITROMETHANE

C(H3)-N-O3 = C-N-H3-O3

V0 = 0.884 CC/G

IN THE TABLE BELOW DENSITY IS IN G/CC, PRESSURE IN KBAR AND VELOCITIES IN KM/SEC, Z0 IS THE LENGTH NEEDED FOR BUILD-UP TO DETONATION IN MM. IN A 20 MM DIAMETER SAMPLE AND GT = GREATER THAN

TABLE

RHO0	US	UP	P	V/V0	Z0
1.13	4.40	1.76	86	0.602	GT50
-	4.15	1.55	73	0.628	-
-	3.78	1.27	54	0.667	-
-	3.50	1.08	43	0.690	-
-	3.37	0.90	35	0.730	-
-	2.83	0.62	20	0.782	-

US = 2.07 + 1.34 UP KM/SEC, SIG.US = 0.06 KM/SEC.

COMMENTS:

1) SOURCE: ILYUKIN V. S., POKHIL P. F., ROZANOV O. K. AND SHVEDOVA N. S.
DOKLADY AKAD NAUK SSSR VOL.131, P.793 (1960), OR
SOVIET PHYS. DOKLADY VOL.5, P.337 (1060) (ENGLISH)
2) EXPERIMENTAL METHOD A
DATA REDUCTION METHOD B STANDARD MATERIAL COPPER.

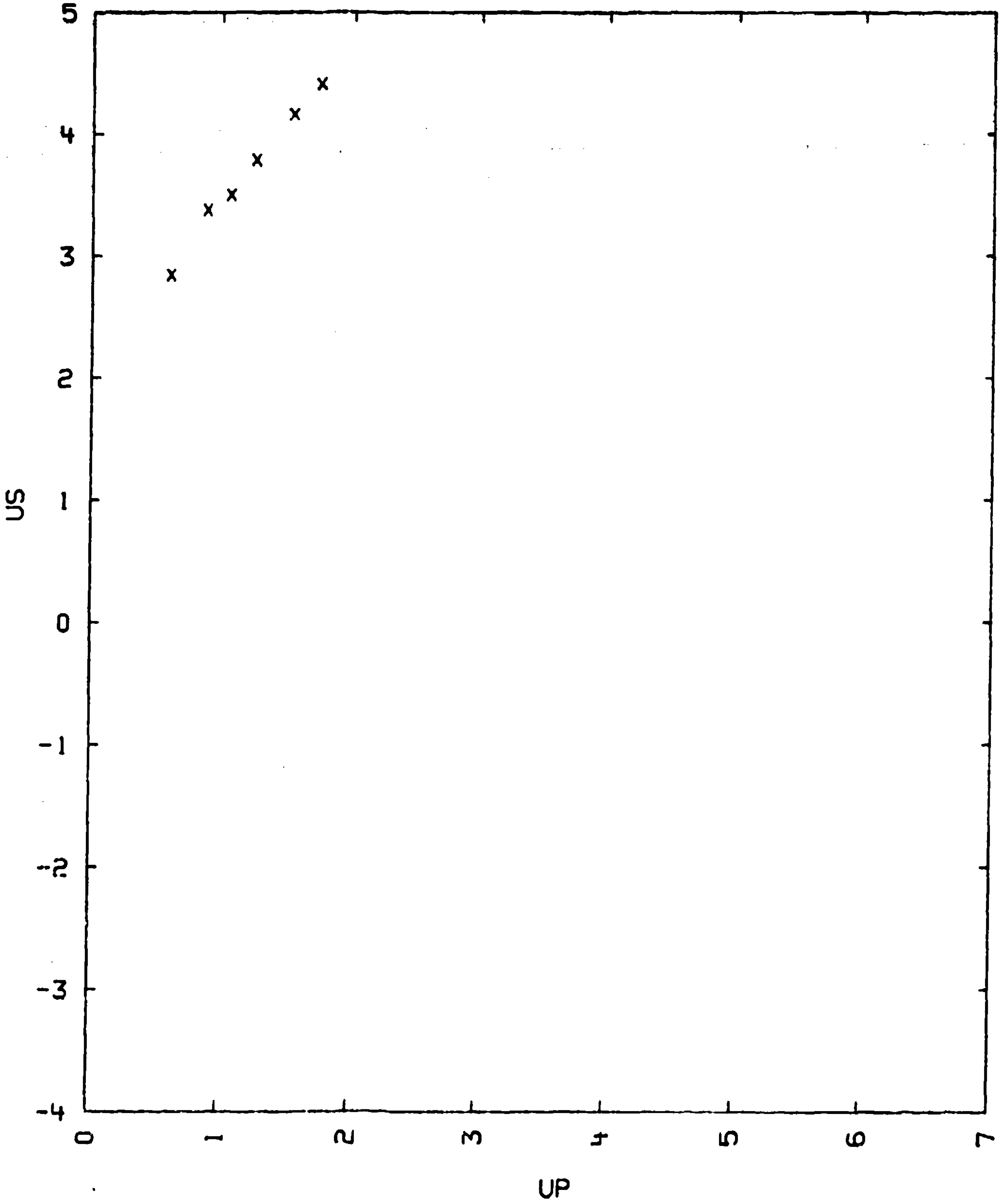
US	AND UP OF COPPER
5.60	1.00
5.34	0.87
5.03	0.71
4.82	0.60
4.64	0.51
4.32	0.35

3) THE ABOVE FIT YIELDS A PRESSURE OF 209 KB AT THE DETONATION VELOCITY WHILE PCJ = 120 KBAR.

TABLE I

NITROMETHANE

23-18-2-1(1-1-3-3)---1



23-18-2-1(1-1-3-3)---2
NITROMETHANE

C-H3-N-O3

TO = 17.2-22.0 DEG. C
VO = 0.8865-0.8905 CC/G

IN THE TABLE BELOW, TEMPERATURE (TO) IS GIVEN IN DEGREES CENTIGRADE, DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

TO	RHOO	US	UP	P	V/VO
20.4	1.125	2.918	0.743	24.4	0.745
19.2	1.126	3.080	0.912	31.6	0.704
17.8	1.128	3.670	1.270	53.3	0.654
22.0	1.123	3.819	1.344	57.6	0.648
22.0	1.123	3.761	1.317	55.6	0.650
18.0	1.128	3.885	1.320	57.8	0.660
17.2	1.128	4.025	1.380	62.7	0.657
19.6	1.125	3.882	1.364	59.7	0.649
22.0	1.123	4.016	1.476	66.6	0.633
21.6	1.123	4.077	1.470	67.3	0.639
17.3	1.128	4.243	1.493	71.5	0.648
22.1	1.123	4.639	1.839	95.8	0.604
22.0	1.123	4.629	1.841	95.7	0.602

US = 1.560 + 1.721*UP + 1.082(1.125 - RHOO) KM/SEC
SIGMA US = 0.05 KM/ESC

COMMENTS:

1) SOURCE: CRAIG, B. G.
REPORT NO. GMX-8-MR-62-4 (1962)
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE E: THE SAMPLE WAS CONTAINED IN A WEDGE-SHAPED CELL MOUNTED ON THE BASE PLATE. THE FREE SURFACE OF THE BASE PLATE AND THE FREE SURFACE OF THE SAMPLE CELL WERE MEASURED. THUS, AN AVERAGE UP IS DETERMINED.
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL ALUMINUM 2024
3) DETONATION OF THE SAMPLE OCCURRED WHEN UP WAS 1.839 KM/ESC. THE DIFFERENCE IN THE TWO PARTICLE VELOCITIES OF THE UNREACTED NITROMETHANE SAMPLE OBTAINED FROM THE BASE AND COVER PLATES WAS APPROXIMATELY +OR- 0.05 KM/SEC. SINCE THERE WAS NO CORRELATION OF THIS DIFFERENCE WITH PRESSURE IT SEEMS THAT NO SIGNIFICANT REACTION OR ATTENUATION OCCURRED BEHIND THE SHOCK FRONT, FOR ALL BUT THE HIGHEST PRESSURE.
4) THE EXPERIMENTAL HUGONIOT DATA WERE EXTRAPOLATED TO OBTAIN THE INTERSECTION WITH THE RAYLEIGH LINE (D*RHOO, WHERE D IS THE DETONATION VELOCITY). THIS INTERSECTION DETERMINES A VON NEUMANN SPIKE OF

199 KILOBARS, UP = 2.820 KM/SEC.

5) THE DENSITIES WERE CALCULATED USING THE THERMAL EXPANSION COEFFICIENT B0:

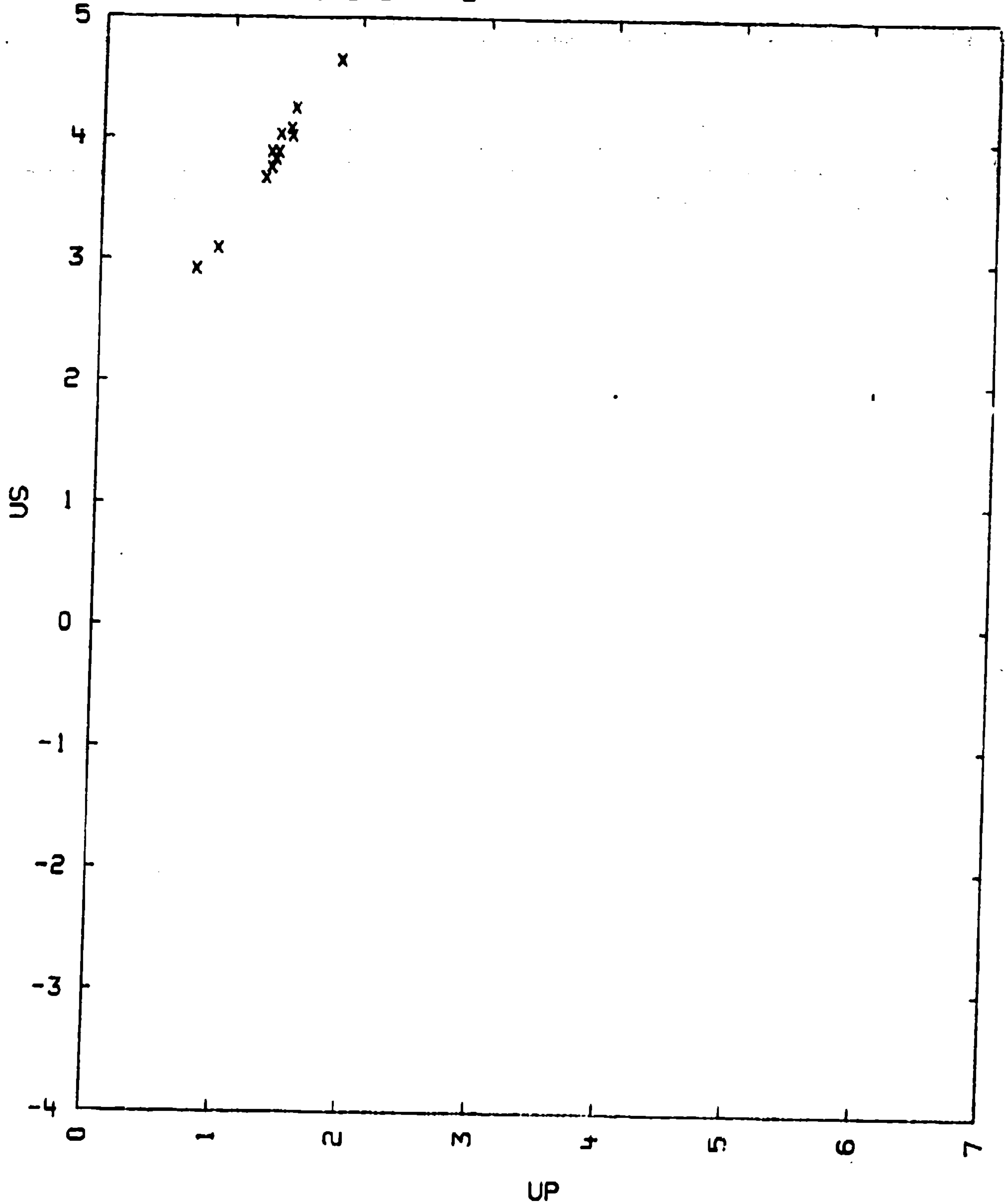
B0 = (1.158 +OR- 0.01)*10**(-3)

MALIN, CAMPBELL, AND HOLLAND, JOURNAL OF APPLIED PHYSICS, VOL. 27, P 963 (1956).

TABLE I

NITROMETHANE

23-18-2-1(1-1-3-3)---2



23-18-2-1(2-X-Y-Z)---1
NYLON (POLYAMID)

C(2)N(X)H(Y)O(Z)

V0 = 0.877 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

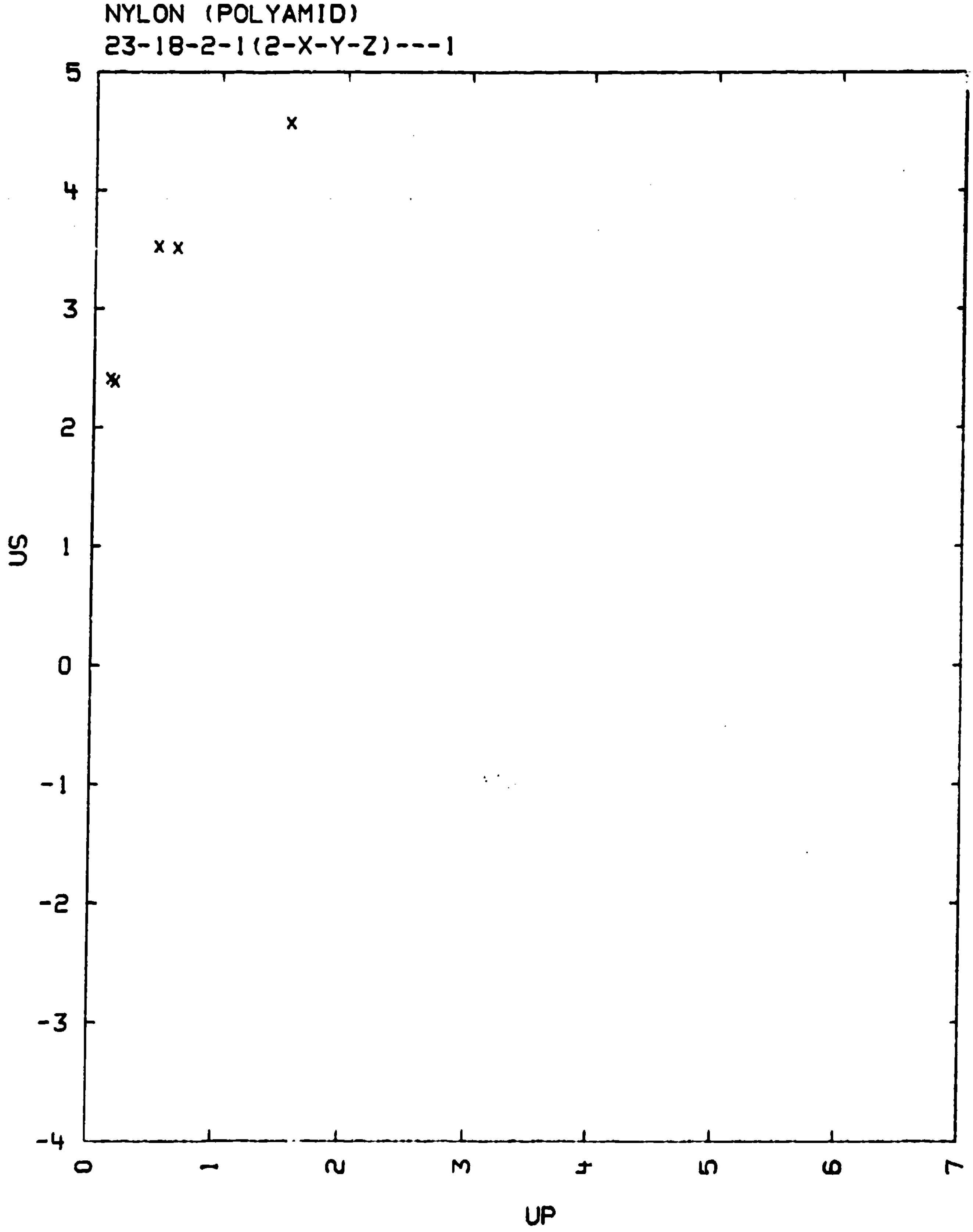
RHOO	US	UP	P	V/V0
1.14	2.40	0.135	3.64	0.9437
-	2.38	0.165	4.50	0.9307
-	3.52	0.505	20.2	0.8565
-	3.51	0.665	26.6	0.8105
-	4.56	1.55	80.2	0.6601

US = 2.29 + 1.63 UP MM/MICROSEC

COMMENTS:

1) SOURCE: WAGNER, M.H., WALDORF, W.F. AND LOUIE, N.A.
REPORT NO. AFSWC-TDR-62-66, VOL. I (1962)
WORK DONE AT DOWNEY, CALIFORNIA.
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE D
IN THE TABLE UP = (1/2)UFS
3) ACCURACY IS LIMITED BECAUSE ASSEMBLY DIMENSIONS ALLOW RELATIVELY LARGE DEVIATIONS FROM ONE-DIMENSIONALITY.

TABLE I



23-18-2-1(2-X-Y-Z)---2
NYLON (POLYAMID)

C(2)N(X)H(Y)O(Z) WHERE X,Y,Z ARE RATIONAL NUMBERS

V0 = 0.8718 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN MM/SEC. PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

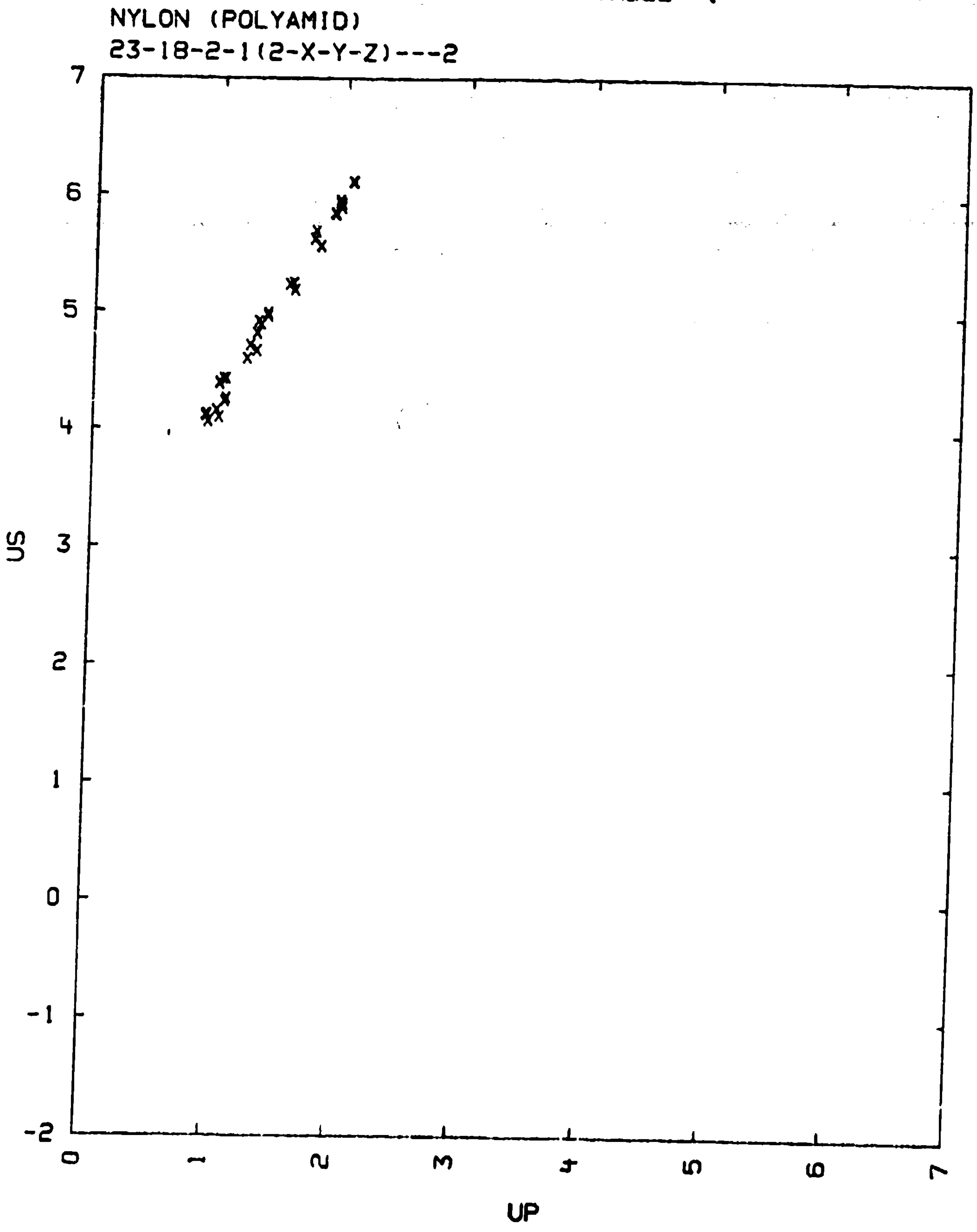
SAMPLE					STANDARD
RHOO	US	UP	P	V/V0	UFS
1.147	5.924	1.873	134	0.667	2.765
-	5.896	1.975	133.5	0.665	2.750
-	6.105	2.057	144	0.663	2.910
-	6.105	2.071	145	0.661	2.880
-	5.834	1.913	128	0.672	2.650
-	5.834	1.928	129	0.670	2.665
-	5.924	1.959	133	0.669	2.740
-	5.945	1.957	133.5	0.671	2.735
-	5.624	1.753	114	0.688	2.440
-	5.567	1.813	116	0.674	2.510
-	5.682	1.763	115	0.690	2.445
-	5.682	1.763	115	0.690	2.445
-	5.242	1.592	95.5	0.696	2.175
-	5.192	1.600	96	0.692	2.185
-	5.236	1.567	94	0.701	2.142
-	5.225	1.567	94	0.700	2.140
-	4.980	1.395	79.5	0.720	1.880
-	4.955	1.386	79	0.720	1.875
-	4.897	1.335	75	0.727	1.790
-	4.916	1.312	74	0.733	1.775
-	4.812	1.309	72	0.728	1.760
-	4.668	1.305	70.5	0.720	1.740
-	4.716	1.250	67.5	0.735	1.670
-	4.599	1.228	65	0.733	1.645
-	4.421	1.045	53	0.764	1.335
-	4.421	1.065	54	0.759	1.350
-	4.252	1.065	52	0.750	1.392
-	4.230	1.062	51.5	0.749	1.392
-	4.058	0.925	43	0.772	1.185
-	4.119	0.922	43.5	0.776	1.185
-	4.125	0.909	43	0.780	1.777
-	4.112	0.911	43	0.778	1.180
-	4.156	0.996	47.5	0.760	1.297
-	4.098	1.011	47.5	0.753	1.305
-	4.378	1.016	51	0.768	1.325
-	4.394	1.012	51	0.770	1.328

US = 2.500 + 1.747 UP KM/SEC.

COMMENTS:

1) SOURCE: BERGER J. AND FAUQUIGNON C.
PRIVATE COMMUNICATION (1964), B.P. NO. 7, SEVRAN, FRANCE
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIALS ALUMINUM AU4G
3) SAMPLE DIMENSIONS WERE: 2.0 CM DIAMETER
0.5 CM THICKNESS

TABLE I



23-18-2-1(2-X-Y-Z)---3
POLYURETHANE FOAM

C(2)N(X)H(Y)O(Z)

V0 = 3.125 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

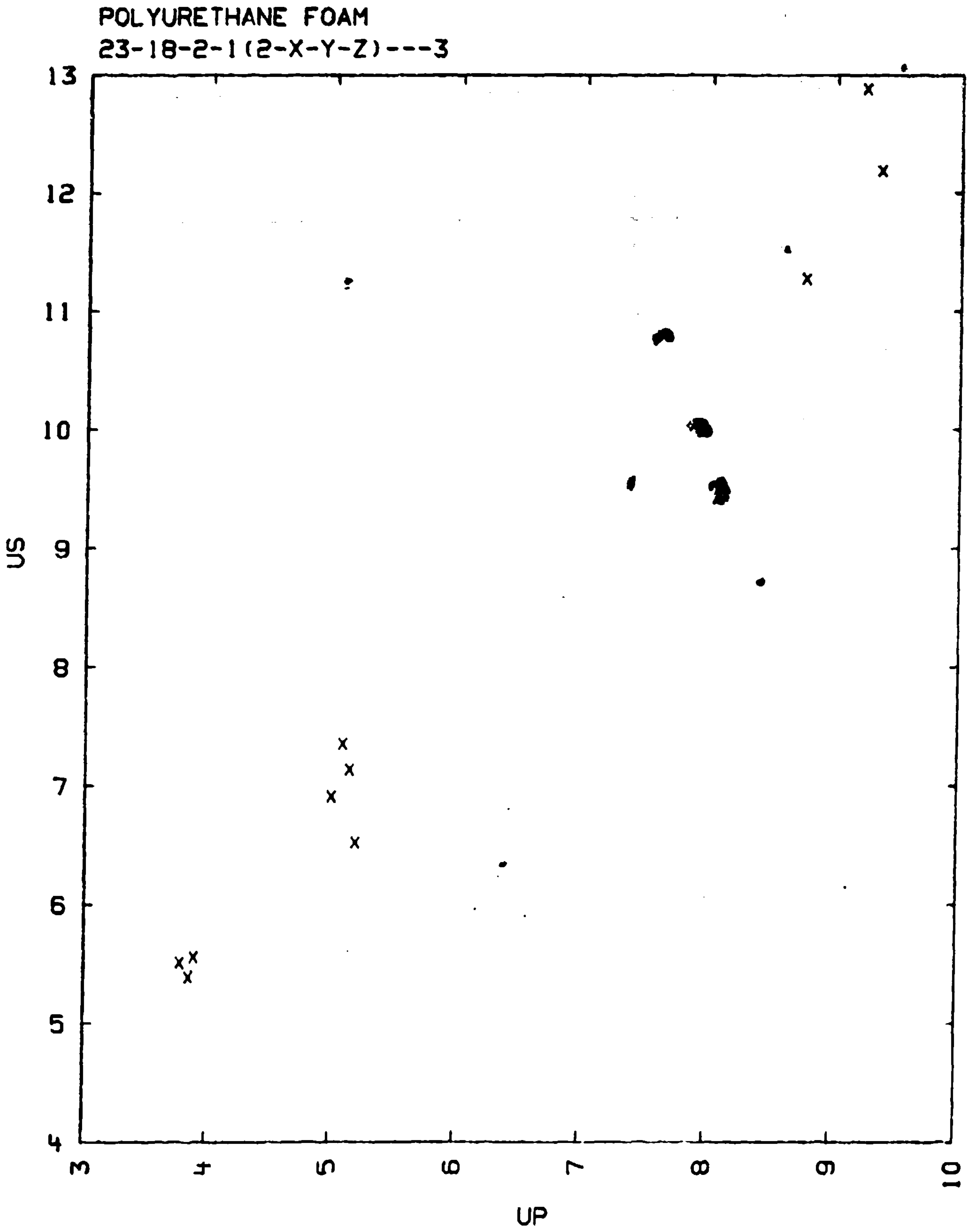
RHO0	US	UP	P	V/V0
0.32	5.51	3.79	70	.312
-	5.38	3.86	70	.283
-	5.55	3.91	70	.296
-	6.52	5.21	110	.201
-	6.90	5.01	110	.274
-	7.13	5.15	117	.282
-	7.35	5.10	120	.306
-	12.19	9.36	365	.216
-	11.27	8.76	316	.223
-	12.88	9.23	380	.283

US = 0.35 + 1.290 UP KM/SEC. SIG.US = 0.38 KM/SEC.

COMMENTS:

1) SOURCE: SKIDMORE, I.C. AND MORRIS, E.
THERMODYNAMICS OF NUCLEAR MATERIALS, P. 173 FF. (1962)
INTERN. AT. ENERGY AGENCY, VIENNA
ATOMIC WEAPONS RESEARCH ESTABLISHMENT, ALDERMASTON, ENGLAND
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B
THE SHOCK WAVE WAS PRODUCED BY AN EXPLOSIVELY ACCELERATED EN3 STEEL PLATE.
THE SHOCK WAS TRANSMITTED THROUGH A STEEL PLATE INTO THE SAMPLE.
3) THE VELOCITY OF THE FLYING PLATE AND THE SHOCK AND SURFACE VELOCITY OF THE TARGET PLATE WERE MEASURED AS WELL AS THE SAMPLE SURFACE AND SHOCK VELOCITIES.
4) DATA SCATTER WAS ABOUT 0.03 MICROSEC.
5) CORRECTIONS WERE MADE FOR FLYING PLATE CURVATURE OF UP TO 1 MICROSEC.
6) THE HIGHER PRESSURES WERE OBTAINED BY A SPHERICALLY CONVERGING SYSTEM.
7) ALL PELLETS WERE SURROUNDED BY LEAD TO REDUCE LATERAL RAREFACTION.

TABLE I


POLYURETHANE FOAM
23-18-2-1(2-X-Y-Z)---3
US
UP
13
12
11
10
9
8
7
6
5
4
3
4
5
6
7
8
9
10

23-18-2-1(3-6-6-6)---1
CYCLOHEXANE,1,3,5-TRINITRO,1,3,5-TRIAZA (HEXOGEN)(CYCLONITE)(EXPLOSIVE)

(-N(N-O2)-C(H2)-)3 = C3-N6-H6-O6

VO = 0.555 CC/G
VOI= 0.549 CC/G

IN THE TABLE BELOW DENSITY IS IN G/CC, PRESSURE IN KBAR AND VELOCITIES IN KM/SEC, ZO IS THE LENGTH NEEDED FOR BUILD-UP TO DETONATION IN MM. IN A 20 MM DIAMETER SAMPLE AND GT = GREATER THAN

TABLE

RHOO	US	UP	P	V/VO	ZO
1.80	5.40	1.60	155	0.705	5
-	5.22	1.40	131	0.731	9
-	4.71	1.16	98	0.752	23
-	4.42	0.98	78	0.782	GT50
-	4.30	0.83	64	0.807	-

US = 2.87 + 1.61*UP KM/SEC.

COMMENTS:

1) SOURCE: ILYUKIN V. S., POKHIL P. F., ROZANOV O. K. AND SHVEDOVA N. S.
DOKLADY AKAD NAUK SSSR VOL.131, P.793 (1960), OR
SOVIET PHYS. DOKLADY VOL.5, P.337 (1060) (ENGLISH)
2) EXPERIMENTAL METHOD A
DATA REDUCTION METHOD B STANDARD MATERIAL.COPPER.

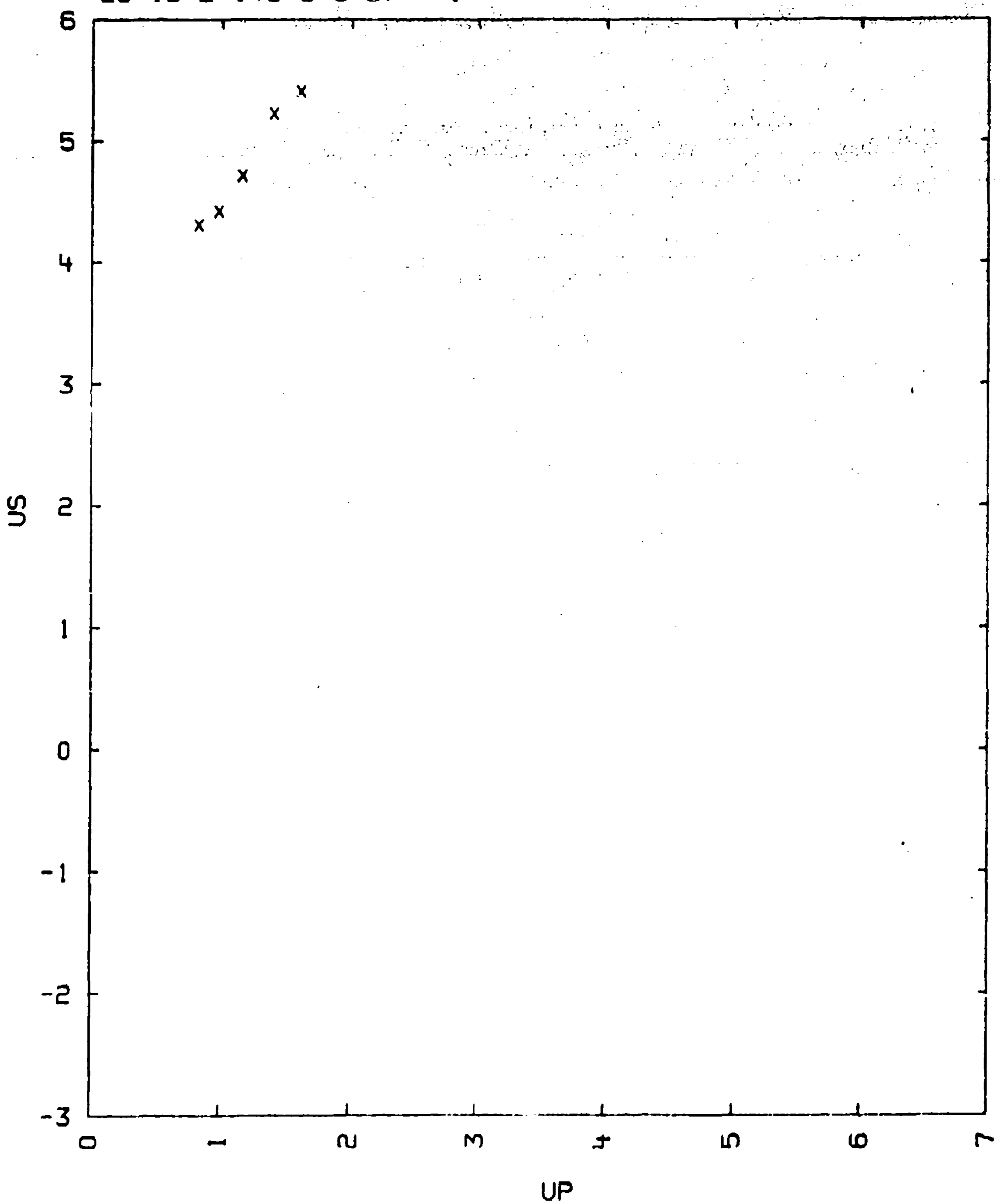
US	AND UP	OF COPPER
5.60	1.00	
5.34	0.87	
5.03	0.71	
4.82	0.60	
4.64	0.51	
4.32	0.35	

3) THE ABOVE FIT YIELDS A PRESSURE OF 592 KB AT THE DETONATION VELOCITY WHILE PCJ = 390 KBARS.
4) VOI WAS OBTAINED FROM THE HANDBOOK OF CHEM. AND PHYS (CHEM RUBBER PUBL. CO. 1964) 45TH ED

TABLE 1

CYCLOHEXANE,1,3,5-TRINITRO,1,3,5-TRIAZA (HEXOGEN)(

23-18-2-1(3-6-6-6)---1



23-18-2-1(6-1-5-2)---1
NITROBENZENE

C6(H5)-N-O2

VO = 0.834 CC/G

THE TABLE LISTS DENSITY IN G/CC., VELOCITIES IN KM/SEC. AND PRESSURE IN KBAR.

TABLE

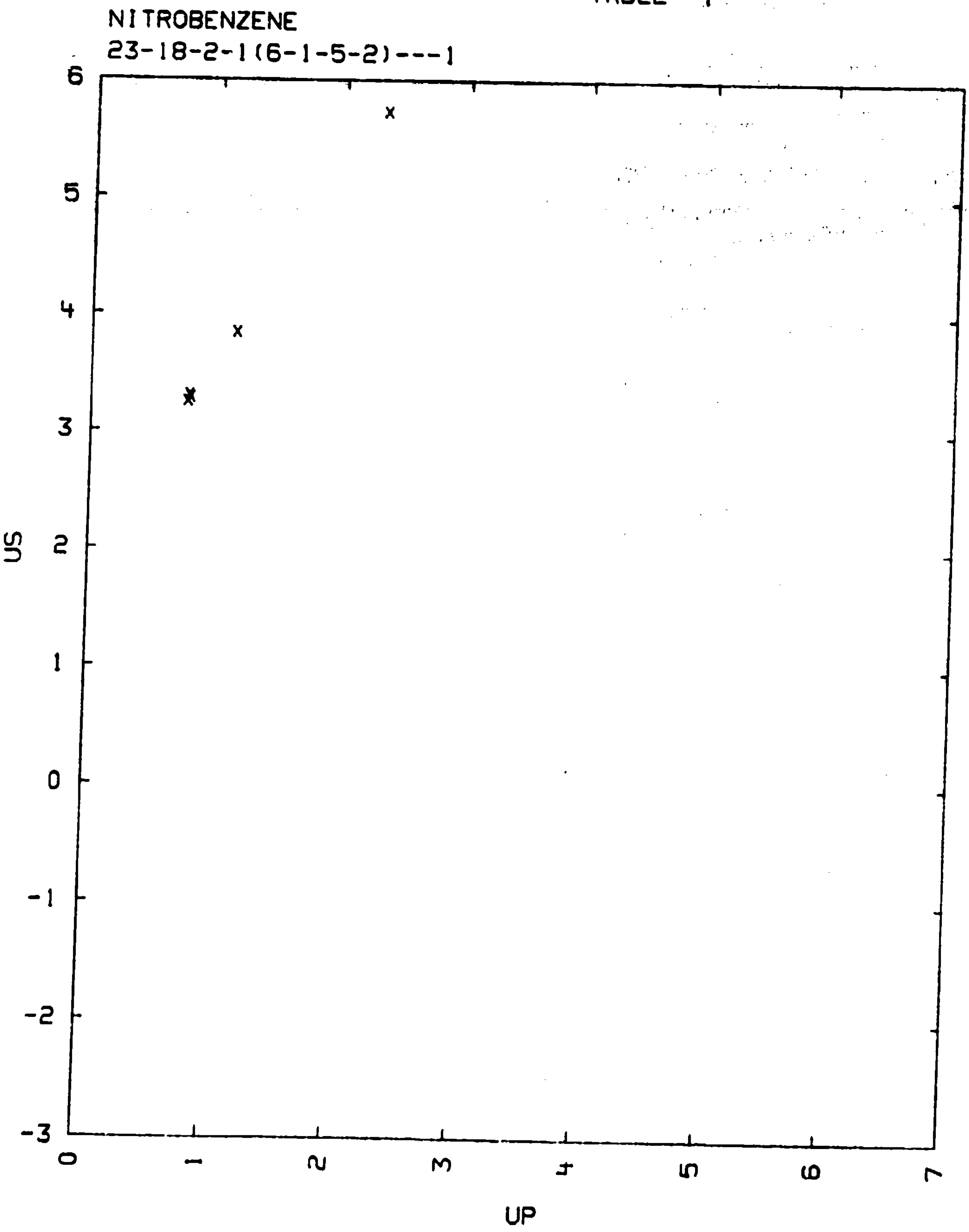
RHOO	US	UP	P	V/VO
1.199	5.72	2.33	160.	0.593
-	3.83	1.17	53.7	0.694
-	3.30	0.79	31.2	0.761
-	3.24	0.78	30.3	0.759
-	3.28	0.80	31.5	0.756

US = 2.01 + 1.59*UP KM/SEC.
SIG US = 0.03 KM/SEC.

COMMENTS:

1) SOURCE: HAUVER, G. E. AND MELANI, A.
PRIVATE COMMUNICATION, JAN. 1969.
BALLISTICS RES. LAB., ABERDEEN PROVING GROUNDS
MARYLAND, USA.
2) EXPERIMENTAL TECHNIQUE: H
DATA REDUCTION TECHNIQUE: B
STANDARD MATERIALS: AL, BRASS, MG, AND PLEXIGLAS WITH US=2.702+1.544*UP AND RHOO= =1.18 G/CC DEFINING THE HUGONIOT OF THE LATTER.
3) THE RELEASE CURVES OF THE METAL WERE LOCATED FROM A MEASUREMENT OF THE SHOCK VELOCITY OF THE PLEXIGLASS STANDARD

TABLE I



23-18-2-1(6-3-3-6)---1
TRINITROBENZENE,1,3,5 (TNB) (EXPLOSIVE)

(-C(H)-C(N-O2)-)3 = C6-N3-H3-O6

V0 = 0.6097 CC/G
V0I= 0.5924 CC/G

C0 = 2.356 KM/SEC

THE TABLE LISTS DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS

TABLE

RHO0	US	UP	P	V/V0
1.640	3.129	0.426	21.8	0.863
-	3.727	0.650	39.7	0.825
-	3.730	0.650	39.7	0.825
-	3.938	0.760	49.0	0.807
-	3.432	0.630	35.4	0.816
-	3.520	0.640	36.9	0.818
-	2.356	0.000	0.0	1.00

US = A + B*UP   A = 2.318 KM/SEC, SIGA = 0.072 KM/SEC
SIGUS = 0.11 KM/SEC B = 2.025, SIGB = 0.123

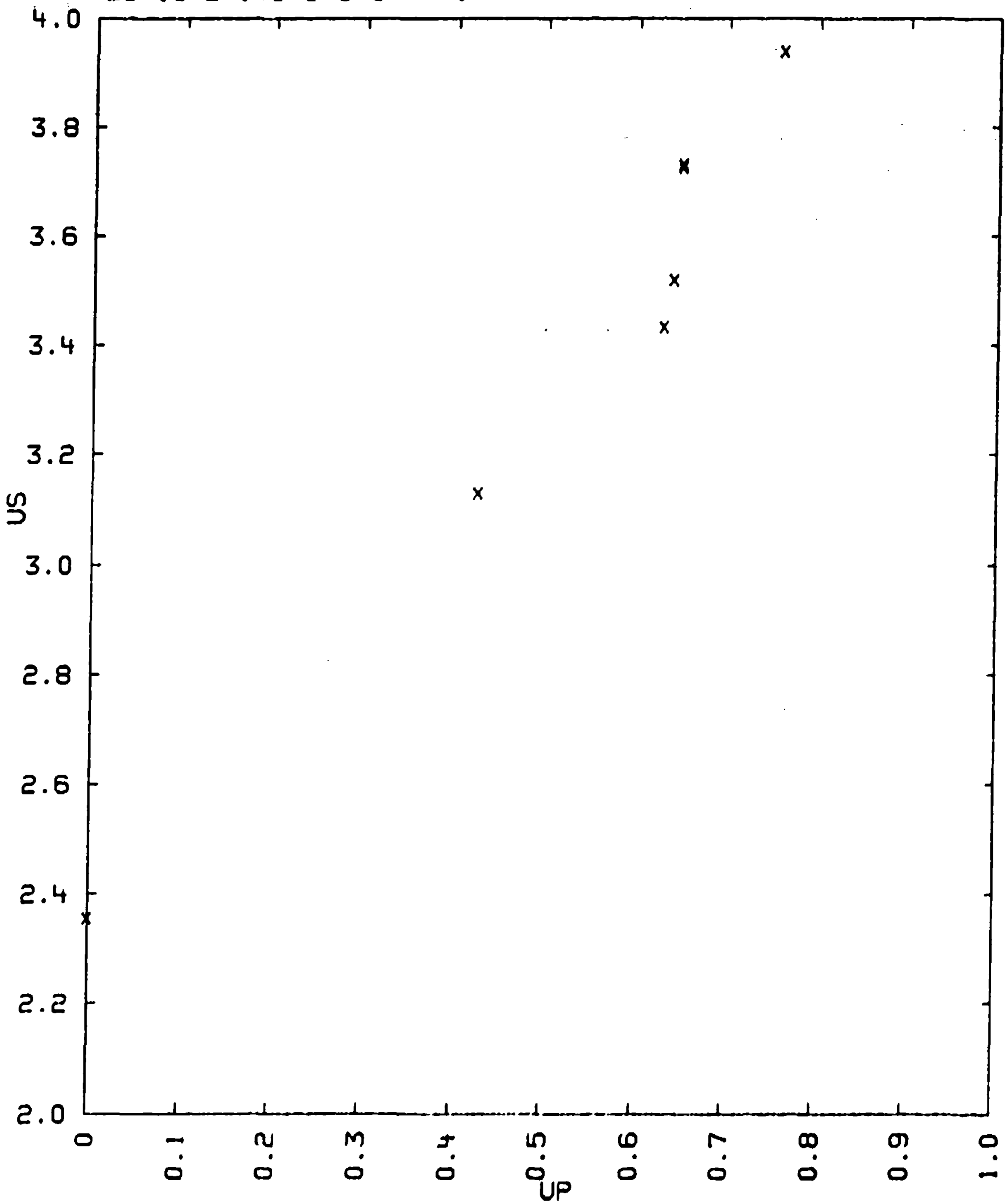
COMMENTS:

1) SOURCE: COLEBURN N. L. AND LIDDIARD JR. T. P.
J. CHEM. PHYS., VOL. 44, P. 1929 (1965)
ALSO: PRIVATE COMMUNICATION
2) EXPERIMENTAL TECHNIQUE C1
DATA REDUCTION METHOD B: UP=1/2*UP WAS ASSUMED FOR THE STANDARD MATERIALS BRASS AND PLEXIGLAS. SO THAT THE PRESSURE RELEASE ISENTROPE COULD BE OBTAINED BY REFLECTING THE P VS UP HUGONIOT IN THE LINE UP = 1/2*UFS
3) FOR BRASS US = 3.560 + 1.833*UP KM/SEC.
FOR PLEXIGLAS US = 2.710 + 1.568*UP - 0.037*UP**2
4) THE GRUNEISEN COEFICIENT GAMMA = V(DP/DE) = 0.716
5) V0I OBTAINED FROM: HANDBOOK OF CHEM. AND PHYS. (CHEM. RUBBER PUBL. CO., CLEVELAND, OHIO, 1963) 44TH ED.
6) C0 IS THE VELOCITY MEASURED ON VERY WEAK SHOCKS WITH AN UNCERTAINTY OF ABOUT 10 PERCENT

TABLE I

TRINITROBENZENE,1,3,5 (TNB) (EXPLOSIVE)

23-18-2-1(6-3-3-6)---1



23-18-2-1(6-4-4-6)---1
BENZENE,1-AMINO,2,4,6-TRINITRO (TNA) (EXPLOSIVE)

-C(N-H2)-C(N-O2)(C(H)-C(N-O2)-)2 = C6-N4-H4-O6 95 PERCENT BY WT
NYLON 5 PERCENT BY WT.

V0 = 0.6250 CC/G

THE TABLE LISTS DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS

TABLE

RHOO	US	UP	P	V/VO
1.600	3.140	0.590	29.6	0.812
-	2.789	0.433	19.3	0.844
-	3.938	0.820	51.6	0.791
-	3.541	0.760	43.0	0.785
-	3.774	0.740	44.6	0.803
-	3.793	0.800	48.5	0.789
-	3.515	0.830	46.6	0.763

US = A + B*UP A = 1.700 KM/SEC, SIGA = 0.243 KM/SEC
SIG US = 0.18 KM/SEC B = 2.531 SIGB = 0.337

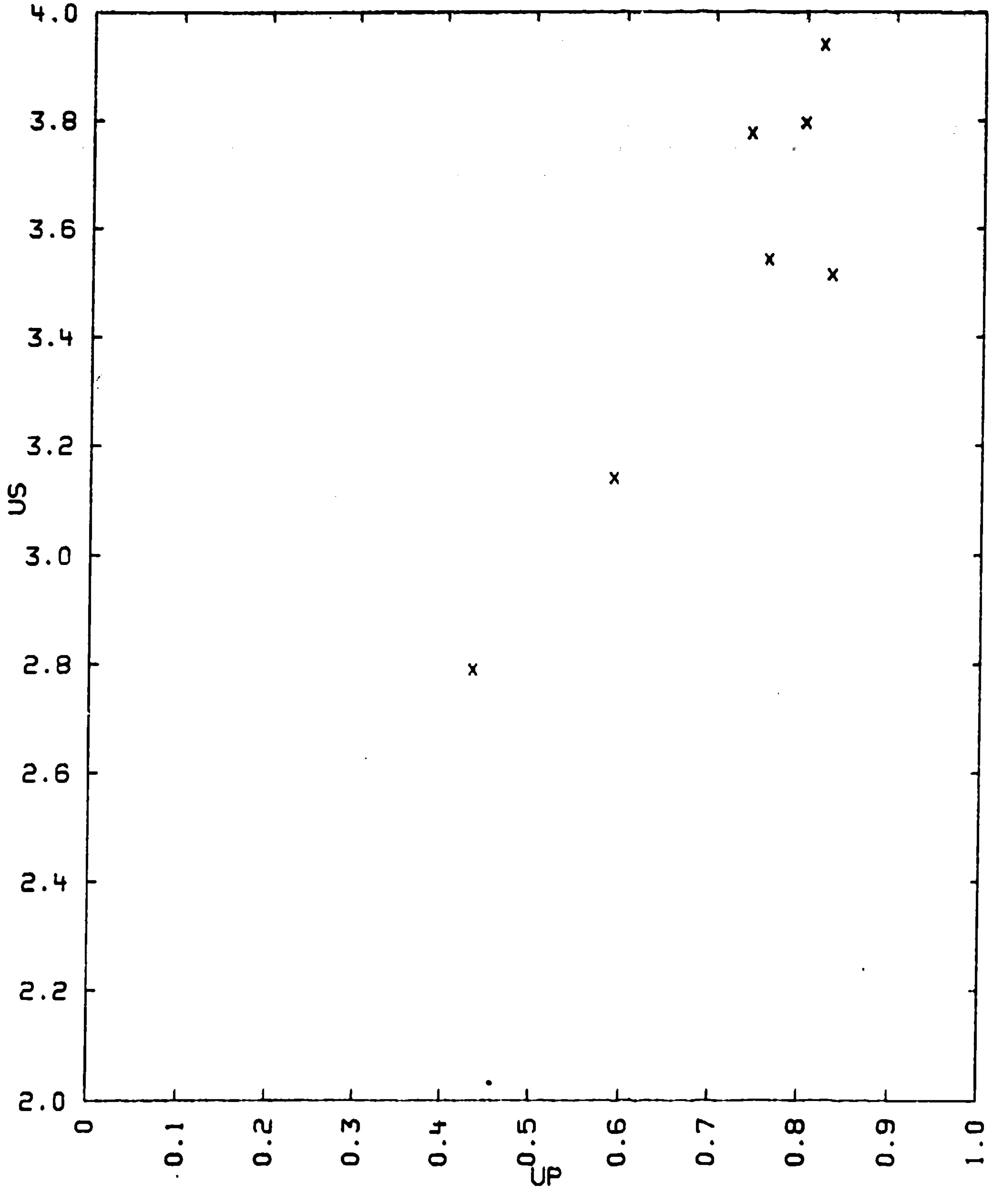
COMMENTS:

1) SOURCE: COLEBURN N. L. AND LIDDIARD JR. T. P.
J. CHEM. PHYS., VOL. 44, P. 1929 (1965)
ALSO: PRIVATE COMMUNICATION
2) EXPERIMENTAL TECHNIQUE C1
DATA REDUCTION METHOD B: UP=1/2*UP WAS ASSUMED FOR THE STANDARD MATERIALS BRASS AND PLEXIGLAS, SO THAT THE PRESSURE RELEASE ISENTROPE COULD BE OBTAINED BY REFLECTING THE P VS UP HUGONIOT IN THE LINE UP = 1/2*UFS
3) FOR BRASS US = 3.560 + 1.833*UP KM/SEC.
FOR PLEXIGLAS US = 2.710 + 1.568*UP - 0.037*UP**2
4) CO IS THE VELOCITY MEASURED ON VERY WEAK SHOCKS WITH AN UNCERTAINTY OF ABOUT 10 PERCENT

TABLE I

BENZENE,1-AMINO,2,4,6-TRINITRO (TNA) (EXPLOSIVE)

23-18-2-1(6-4-4-6)---1



23-18-2-1(6-5-5-6)---1
BENZENE,1,3-DIAMINO,2,4,6-TRINITRO (DATB) (EXPLOSIVE)

-C(H2)-C(N-O2)(C(N-H2)-C(N-O2)-)2 = C6-N5-H5-O6
NYLON IMPURITY 1. PERCENT BY WT.

V0 = 0.5618 CC/G   C0 = 2.660 KM/SEC
V0I= 0.5443 CC/G

THE TABLE LISTS DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS

TABLE

RHO0	US	UP	P	V/V0
1.780	3.132	0.375	20.9	0.880
-	3.496	0.590	36.7	0.831
-	3.350	0.421	25.1	0.874
-	3.605	0.600	38.5	0.833
-	3.498	0.590	36.7	0.831
-	3.900	0.750	52.0	0.807
-	4.247	0.980	74.0	0.769
-	4.373	0.995	77.4	0.772
-	4.517	1.080	86.8	0.760

US = A + B*UP   A = 2.449 KM/SEC, SIGA = 0.043 KM/SEC
SIGUS = 0.063 KM/SEC B = 1.892, SIGB = 0.058

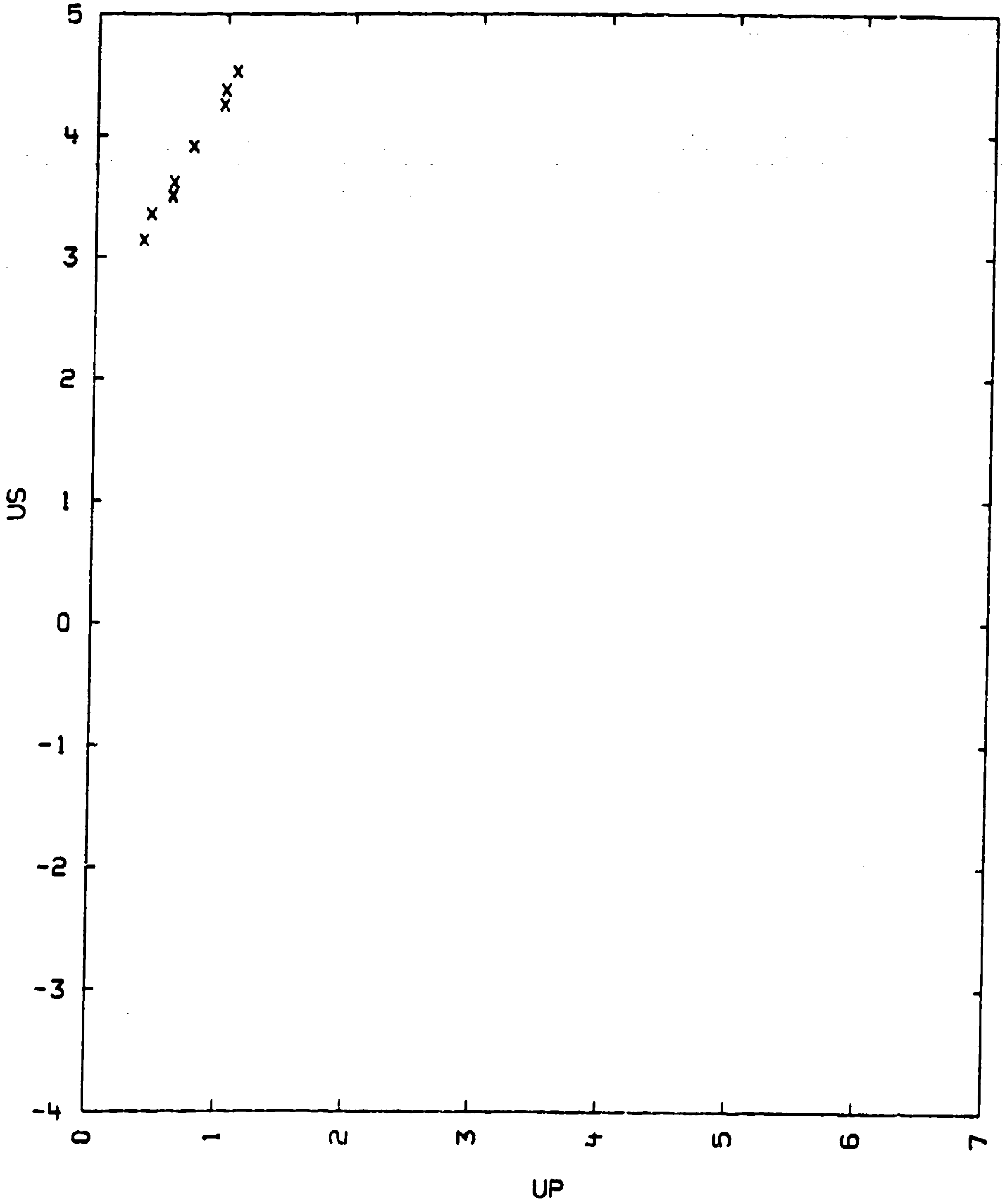
COMMENTS:

1) SOURCE: COLEBURN N. L. AND LIDDIARD JR. T. P.
J. CHEM. PHYS., VOL. 44, P. 1929 (1965)
ALSO: PRIVATE COMMUNICATION
2) EXPERIMENTAL TECHNIQUE CI
DATA REDUCTION METHOD B: UP=1/2*UP WAS ASSUMED FOR THE STANDARD MATERIALS BRASS AND PLEXIGLAS, SO THAT THE PRESSURE RELEASE ISENTROPE COULD BE OBTAINED BY REFLECTING THE P VS UP HUGONIOT IN THE LINE UP = 1/2*UFS
3) FOR BRASS US = 3.560 + 1.833*UP KM/SEC.
FOR PLEXIGLAS US = 2.710 + 1.568*UP - 0.037*UP**2
4) THE GRUNEISEN COEFICIENT GAMMA = V(DP/DE) = 1.76
5) V0I WAS CALCULATED FROM THE LATTICE CONSTANTS A=7.30, B=5.20 AND C=11.63 ANGSTRON, WITH BETHA=95.9 DEGREES OF THE MONOCLINIC UNIT CELL
NAVAL ORDNANCE LABORATORY REPORT NOLTR-62-46 (1962)
J. R. HOLDEN, USNOL, WHITE OAK, SILVER SPRING, MARYLAND, USA
6) C0 IS THE VELOCITY MEASURED ON VERY WEAK SHOCKS WITH AN UNCERTAINTY OF ABOUT 10 PERCENT

TABLE I

BENZENE,1,3-DIAMINO,2,4,6-TRINITRO (DA'B) (EXPLOSI

23-18-2-1(6-5-5-6)---1



23-18-2-1(6-6-6-6)---1
BENZENE,1,3,5-TRIAMINO,2,4,6-TRINITRO (TATB) (EXPLOSIVE)

(-C(N-H2)-C(N-O2)-)3 = C6-N6-H6-O6

V0 = 0.5414 CC/G CO = 2.050 KM/SEC.
V0I= 0.5160 CC/G

THE TABLE BELOW LISTS DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KBARS.

TABLE

RHOO	US	UP	P	V/VO
1.847	3.300	0.339	20.6	0.897
-	3.220	0.413	24.5	0.871
-	3.290	0.411	24.9	0.875
-	3.400	0.441	27.6	0.870
-	3.370	0.442	27.5	0.868
-	3.390	0.452	28.3	0.868
-	3.410	0.450	28.3	0.868
-	3.510	0.514	33.3	0.853
-	3.990	0.780	57.4	0.804
-	4.130	0.818	62.3	0.801
-	4.460	0.877	73.2	0.803
-	4.660	0.969	83.4	0.792
-	4.760	0.970	85.2	0.796
-	4.480	0.993	82.1	0.778
-	4.490	1.010	83.7	0.775
-	4.440	1.033	84.7	0.767
-	4.730	1.015	88.6	0.785
-	4.690	1.017	88.0	0.783
-	5.180	1.125	107.6	0.782
-	5.140	1.128	107.0	0.780
-	5.650	1.420	148.1	0.748

US = A + B*UP A = 2.340 KM/SEC, SIGA = 0.065 KM/SEC
SIG US = 0.14 KM/SEC B = 2.318, SIGB = 0.076

COMMENTS:

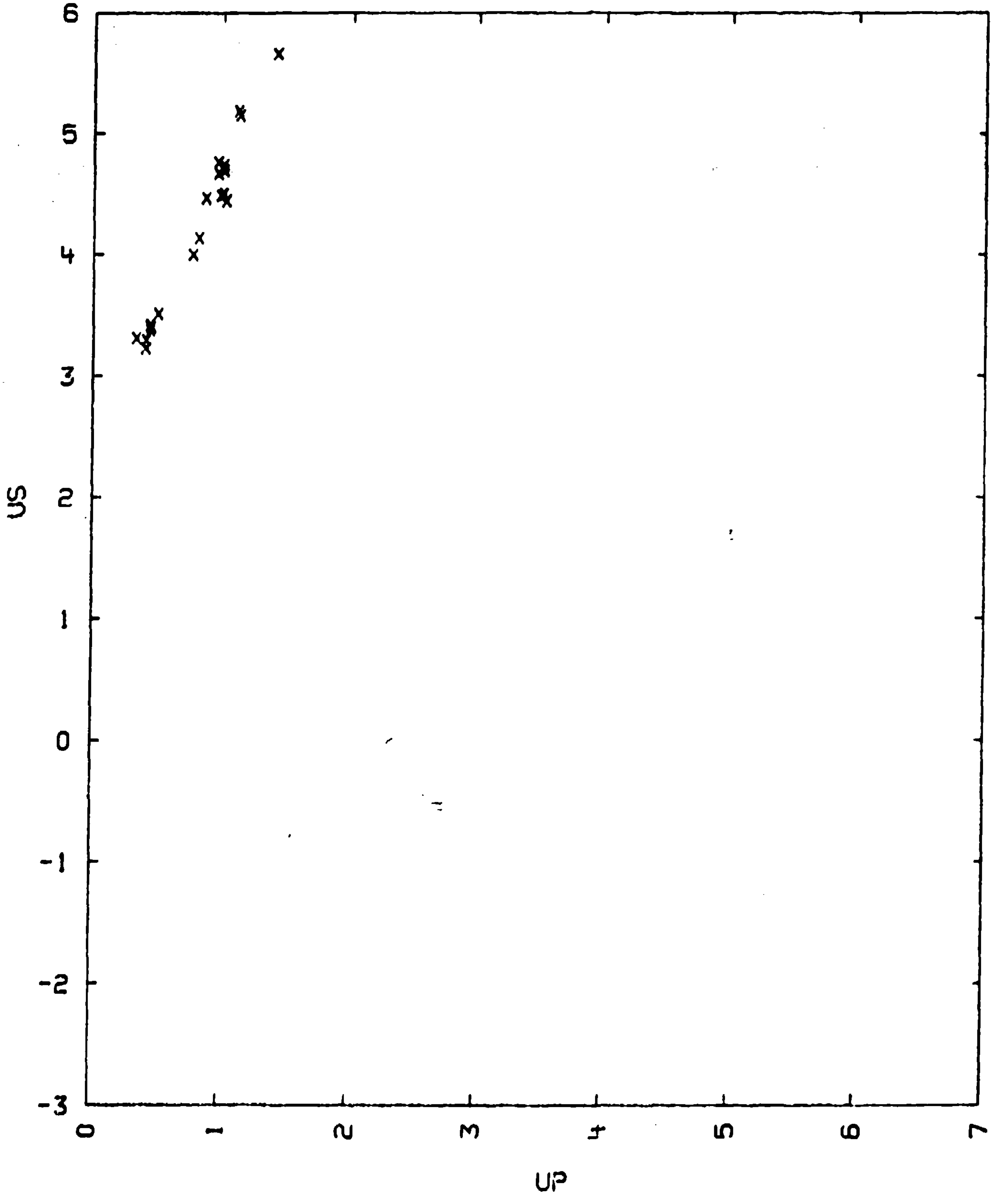
1) SOURCE: COLEBURN N. L. AND LIDDIARD JR. T. P.
J. CHEM. PHYS., VOL. 44, P. 1929 (1965)
ALSO: PRIVATE COMMUNICATION
2) EXPERIMENTAL TECHNIQUE C1
DATA REDUCTION METHOD B: UP=1/2*UP WAS ASSUMED FOR THE STANDARD MATERIALS BRASS AND PLEXIGLAS, SO THAT THE PRESSURE RELEASE ISENTROPE COULD BE OBTAINED BY REFLECTING THE P VS UP HUGONIOT IN THE LINE UP = 1/2*UFS
3) FOR BRASS US = 3.580 + 1.833*UP KM/SEC.
FOR PLEXIGLAS US = 2.710 + 1.568*UP - 0.037*UP**2
4) THE GRUNEISEN COEFICIENT GAMMA = V(DP/DE) = 1.60
5) CO IS THE VELOCITY MEASURED ON VERY WEAK SHOCKS WITH AN

UNCERTAINTY OF ABOUT 10 PERCENT

TABLE I

BENZENE,1,3,5-TRIAMINO,2,4,6-TRINITRO (TATB) (EXPL

23-18-2-1(6-6-6-6)---1



23-18-2-1(7-1-7-2)---1
MONONITROTOLUENE

02-N-C6(H4)-C-H3 = C7-H7-N-02

T0= 12 DEG. CENTIGRADE
V0= 0.856 CC/G

C0 = 1.49 KM/SEC.
AT 20 DEG. CENTIGRADE

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC., PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

RHO0	US	UP	P	V/V0
1.168	5.64	2.300	151.5	0.592
1.168	4.20	1.340	65.8	0.681

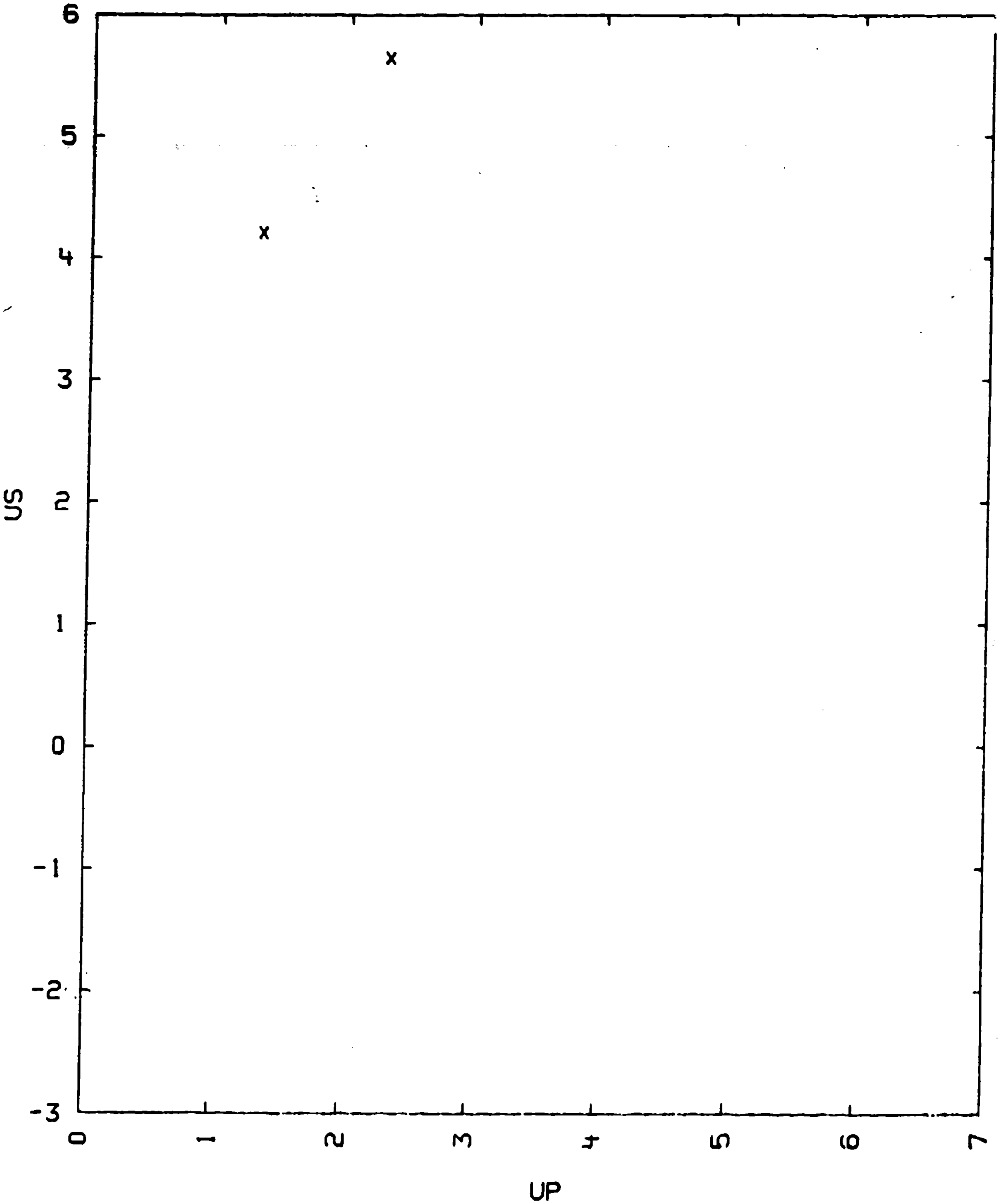
US =

COMMENTS:

1) SOURCE: WALSH J. M. AND RICE M. H.
JOURNAL OF CHEMICAL PHYSICS, VOL. 26, P. 815 (1957)
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL 24ST ALUMINUM
3) C0 WAS OBTAINED FROM L. BERGMANN, DER ULTRASCHALL,(S HIRZEL VERLAG, STUTTGART, 1954) 6TH ED., P. 379

TABLE I

MONONITROTOLUENE
23-18-2-1(7-1-7-2)---1



23-18-2-1(7-1-7-3)---1
O-NITROANISOLE

H3-C-O-(C6-H4)-N-O2 = C7-N-H7-O3

VO = 0.797 CC/G.

THE TABLE LISTS DENSITY IN G/CC., VELOCITIES IN KM/SEC AND PRESSURES IN KBAR.

TABLE

RHOO	US	UP	P	V/VO
1.225	4.96	1.68	104.	0.661
-	4.35	1.48	80.8	0.660
-	4.33	1.42	77.2	0.672
-	4.25	1.40	74.7	0.670
-	4.70	1.62	95.5	0.655
-	4.40	1.42	78.4	0.677
-	4.86	1.80	110.	0.630
-	5.01	1.78	112.	0.644
-	5.97	2.59	194.	0.566
-	5.89	2.34	173.	0.603
-	5.39	2.10	142.	0.610
-	4.08	1.23	63.0	0.698
-	4.14	1.23	63.9	0.703
-	3.34	0.79	33.1	0.763
-	2.91	0.34	12.4	0.883
-	4.50	1.50	84.7	0.667
-	4.54	1.50	85.5	0.670
-	3.99	1.23	61.6	0.692
-	3.50	0.82	36.0	0.766
-	3.52	0.86	38.0	0.756
-	3.48	0.86	37.6	0.753
-	4.04	1.24	62.9	0.693
-	6.07	2.53	193.	0.583
-	5.39	2.03	137.	0.623
-	4.09	1.22	62.6	0.702

US = 2.244 + 1.502*UP KM/SEC.
SIG US = 0.09 KM/SEC.

COMMENTS

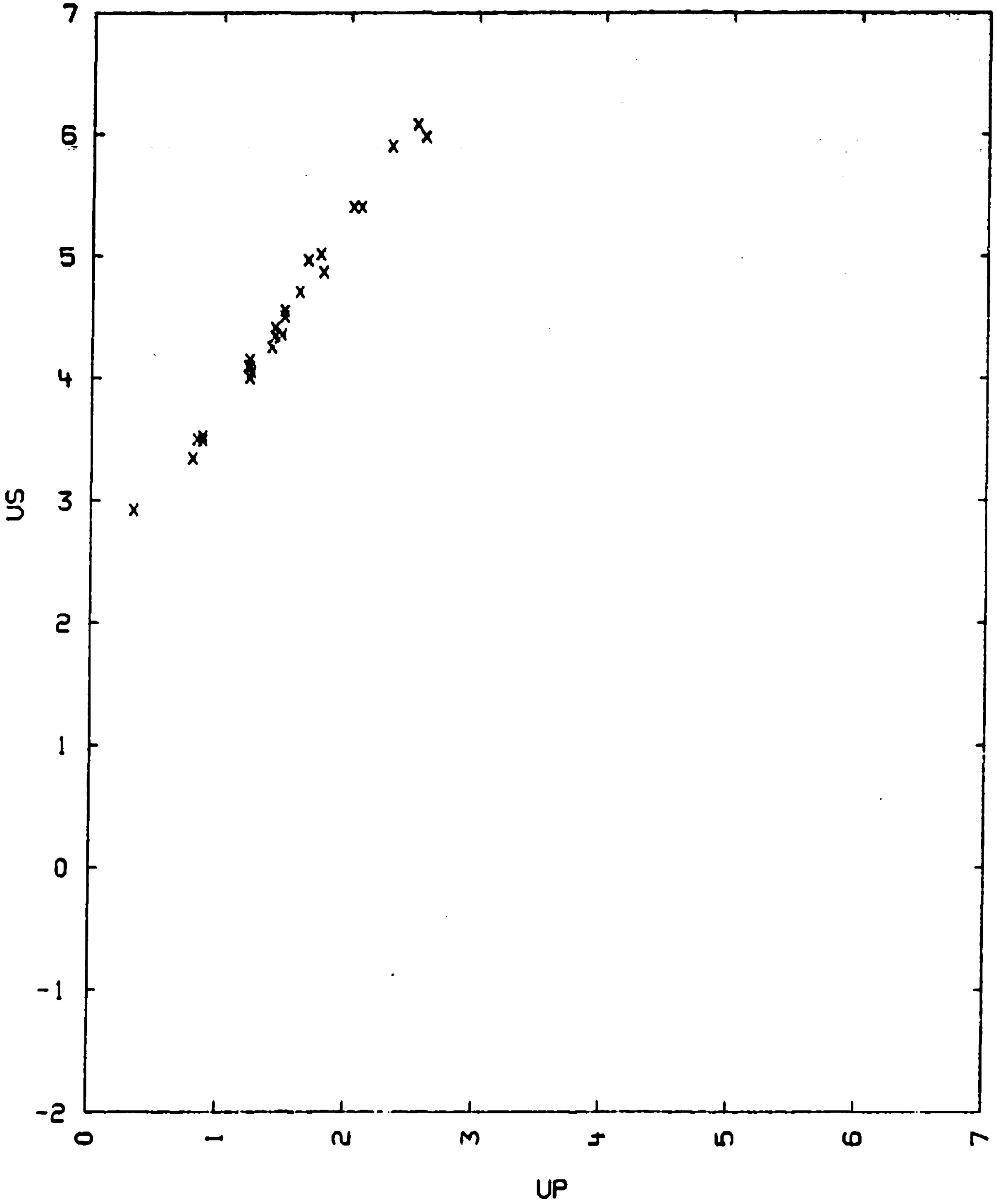
1) SOURCE: HAUVER, G. E. AND MELANI, A.
PRIVATE COMMUNICATION, JAN. 1969.
BALLISTICS RES. LAB., ABERDEEN PROVING GROUNDS
MARYLAND, USA.
2) EXPERIMENTAL TECHNIQUE: H
DATA REDUCTION TECHNIQUE: B
STANDARD MATERIALS: AL, BRASS, MG, AND
PLEXIGLAS WITH US=2.702+1.544*UP AND RHOO=
=1.18 G/CC DEFINING THE HUGONIOT OF THE

LATTER.

3) THE RELEASE CURVES OF THE METAL WERE LOCATED FROM A MEASUREMENT OF THE SHOCK VELOCITY OF THE PLEXIGLASS STANDARD

TABLE I

O-NITROANISOLE
23-18-2-1(7-1-7-3)---1



23-18-2-1(7-3-5-6)---1
TRINITROTOLUENE-2,4,6 (TNT) (EXPLOSIVE)

-C(C-H3)-C(N-O2)(-C(H)-C(N-O2)-)2 = C7-N3-H5-O6

V0 = 0.6196 CC/G
V01= 0.6046 CC/G   C0 = 2.572 KM/SEC

IN THE TABLE BELOW DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS. AL DENOTES ALUMINUM AND BR BRASS.

TABLE

SAMPLE					HOLDER	
RHO0	US	UP	P	V/V0	MATRL	UP
1.614	3.039	0.335	16.43	0.8897	BR	0.194
-	3.137	0.314	15.89	0.8999	BR	0.183
-	3.021	0.348	16.96	.8848	BR	0.201
-	3.054	0.347	17.10	0.8863	BR	0.201
-	3.242	0.399	20.87	0.8769	BR	0.233
-	3.394	0.419	22.95	0.8765	BR	0.247
-	3.359	0.434	23.52	0.8707	BR	0.255
-	3.152	0.476	24.21	0.8489	BR	0.277
-	3.247	0.484	25.36	0.8509	BR	0.283
-	3.441	0.491	27.26	0.8573	BR	0.289
-	4.103	0.732	48.47	0.8215	BR	0.441
-	4.137	0.831	55.48	0.7991	BR	0.501
-	4.185	0.859	58.02	0.7947	BR	0.518
-	4.033	0.793	51.61	0.8033	BR	0.476
-	4.131	0.831	55.40	0.7988	BR	0.501
-	4.157	0.885	59.37	0.7871	BR	0.534
-	4.556	1.005	73.90	0.7794	BR	0.614
-	4.489	1.009	73.10	0.7752	BR	0.614
-	5.374	1.466	127.1	0.7272	AL	1.095
-	5.311	1.475	126.4	0.7222	AL	1.095

US = A + B*UP   A = 2.390 KM/SEC   B = 2.050 KM/SEC
SIG US = 0.10   SIGA A = 0.032 KM/SEC   SIG B = 0.034

COMMENTS:

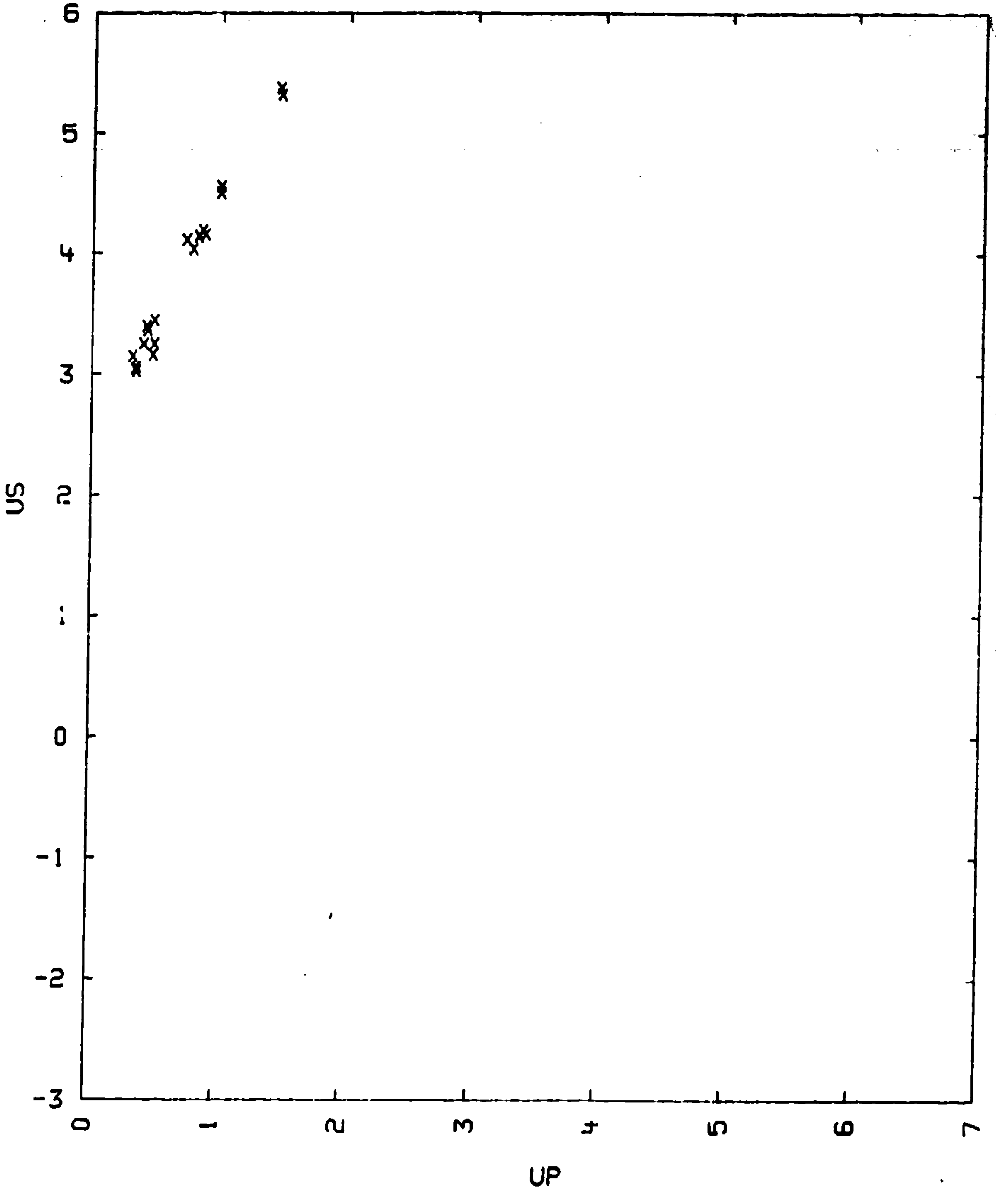
1) SOURCE: COLEBURN N. L. AND LIDDIARD JR. T. P.
J. CHEM. PHYS., VOL. 44, P. 1929 (1965)
ALSO: PRIVATE COMMUNICATION.
2) EXPERIMENTAL TECHNIQUE C1
DATA REDUCTION METHOD B
THE HUGONIOT AND RELEASE ISENTROPES OF THE SAMPLE HOLDER WERE TAKEN TO BE MIRROR IMAGES IN THE P VS. UP PLANE.
FOR BRASS US = 3.560 + 1.833*UP KM/SEC WAS USED WITH RHO0 = 8.37 G/CC.
FOR 24ST ALUMINUM US = 5.35 + 1.34*UP KM/SEC WAS USED.

3) AN ALUMINIZED MYLAR FILM WAS PLACED ON THE SAMPLE WITH A THIN LAYER OF SILICONE GREASE TO INCREASE THE REFLECTIVITY.
4) THE GRUNEISEN COEFFICIENT GAMMA = V(DP/DE) = 0.737.
5) VOI WAS OBTAINED FROM THE HANDBOOK OF CHEMISTRY AND PHYSICS (CHEM RUBBER PUBLISHING CO. 1963) 44TH ED.
6) CO IS THE VELOCITY MEASURED ON VERY WEAK SHOCKS WITH AN UNCERTAINTY OF ABOUT 10 PERCENT.

TABLE I

TRINITROTOLUENE-2,4,6 (TNT) (EXPLOSIVE)

23-18-2-1(7-3-5-6)---1



23-18-2-1(7-3-5-6)---2
TRINITROTOLUENE-2,4,6 (TNT) (EXPLOSIVE)

-C(C-H3)-C(N-O2)(-C(H)-C(N-O2)-)2 = C7-N3-H5-O6

TO = 80.7 - 82.0 DEG. C. CO = 1.37 KM/SEC.
VO = 0.679 - 0.680 CC/G

THE TABLE BELOW LISTS DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KBARS.

TABLE

TO	RHOO	US	UP	P	V/VO
80.7	1.473	3.552	0.860	44.5	0.758
82.0	1.470	3.872	1.141	65.2	0.705
80.7	1.473	4.183	1.328	81.7	0.683
80.7	1.473	4.603	1.601	108.5	0.652
81.0	1.473	4.607	1.561	105.8	0.661
82.3	1.470	4.640	1.569	106.8	0.662
80.7	1.473	4.727	1.596	111.3	0.662

US = 2.14 + 1.57*UP KM/SEC
SIG US = 0.06 KM/SEC.

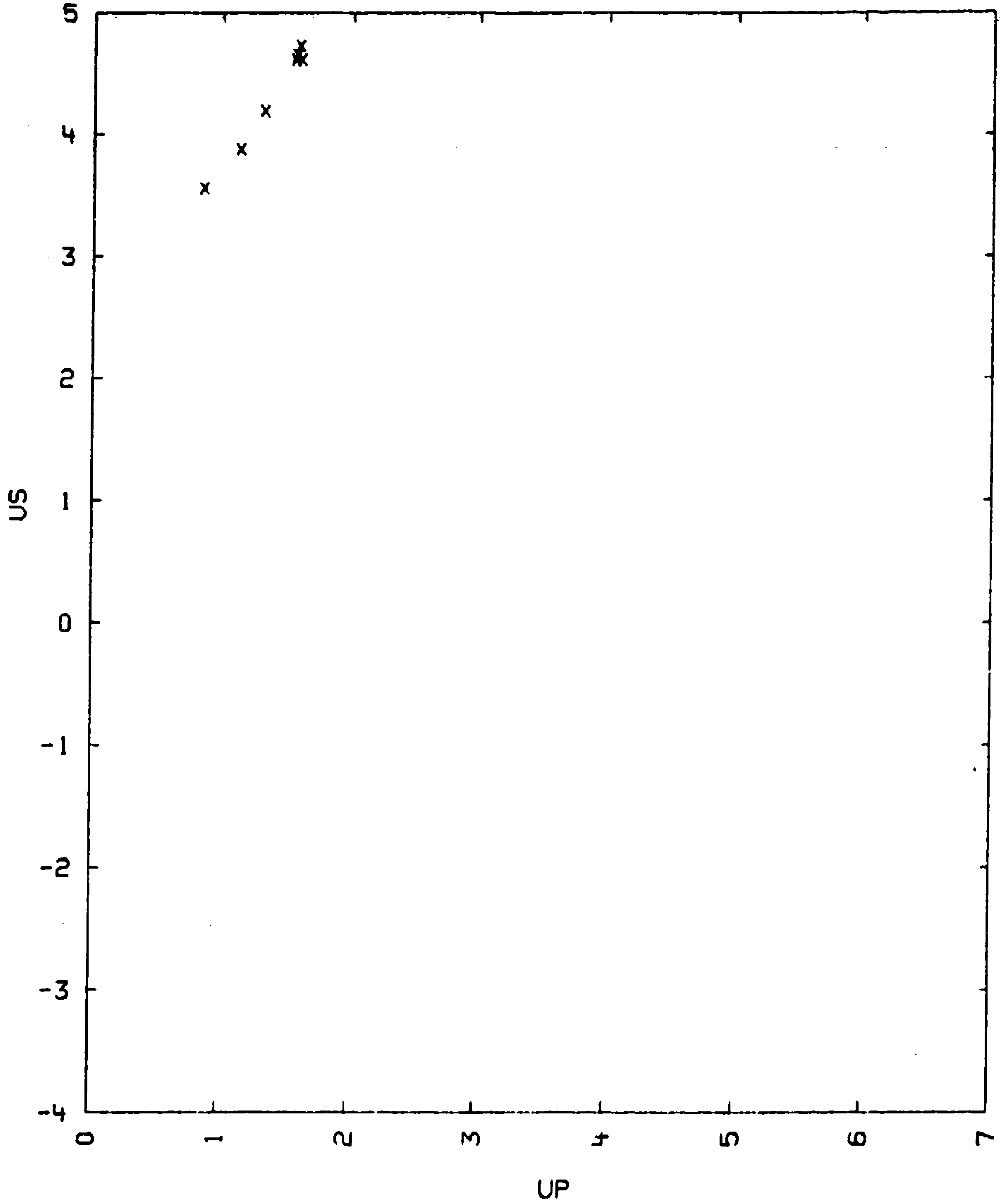
COMMENTS:

1) SOURCE: GARN W. B.
J. CHEM. PHYS. VOL. 30, P. 819 (1959)
2) EXPERIMENTAL METHOD B
DATA REDUCTION METHOD B 24ST ALUMINUM STANDARD
3) THE SPREAD OF THE US-UP POINTS IS TYPICALLY 2.5 PERCENT AND YIELD A PROBABLE ERROR OF 0.7 PERCENT.
4) THE SAMPLE WAS IN LIQUID FORM NEAR THE FREEZING TEMPERATURE
5) CO WAS OBTAINED BY J. B. RAMSAY AT 82 DEG. C. (GMX-8-MR-63-12)
LOS ALAMOS SCIENTIFIC LABORATORY
LOS ALAMOS, NEW MEXICO
THIS VALUE IS MUCH SMALLER THAN THE ROOM TEMPERATURE VALUE OF THE SOLID: 2.08 KM/SEC AT A DENSITY OF 1.637 G/CC.
J. B. RAMSAY AND A. POPOLATO 4TH SYMP. DETONATIONS OCT 1965

TABLE I

TRINITROTOLUENE-2,4,6 (TNT) (EXPLOSIVE)

23-18-2-1(7-3-5-6)---2



23-18-2-1(7-3-5-6)---3
TRINITROTOLUENE (TNT EXPLOSIVE) (EXPLOSIVE)

(C-H3)C-C(N-O2)(-C(H)-C(N-O2)-)2 = C7-N3-H5-O6

V0 = 0.617 CC/G
V01 = 0.6046 CC/G

IN THE TABLE BELOW DENSITY IS IN G/CC, PRESSURE IN KBAR AND VELOCITIES IN KM/SEC, Z0 IS THE LENGTH NEEDED FOR BUILD-UP TO DETONATION IN MM. IN A 20 MM DIAMETER SAMPLE AND GT = GREATER THAN

TABLE

RHO0	US	UP	P	V/V0	Z0
1.62	5.22	1.64	139	0.686	8
-	4.93	1.44	115	0.710	13
-	4.60	1.17	87	0.747	GT50
-	4.35	1.00	70	0.769	GT50
-	4.20	0.84	57	0.800	GT50

US = 3.09 + 1.29 UP KM/SEC, SIG.US = 0.26 KM/SEC

COMMENTS:

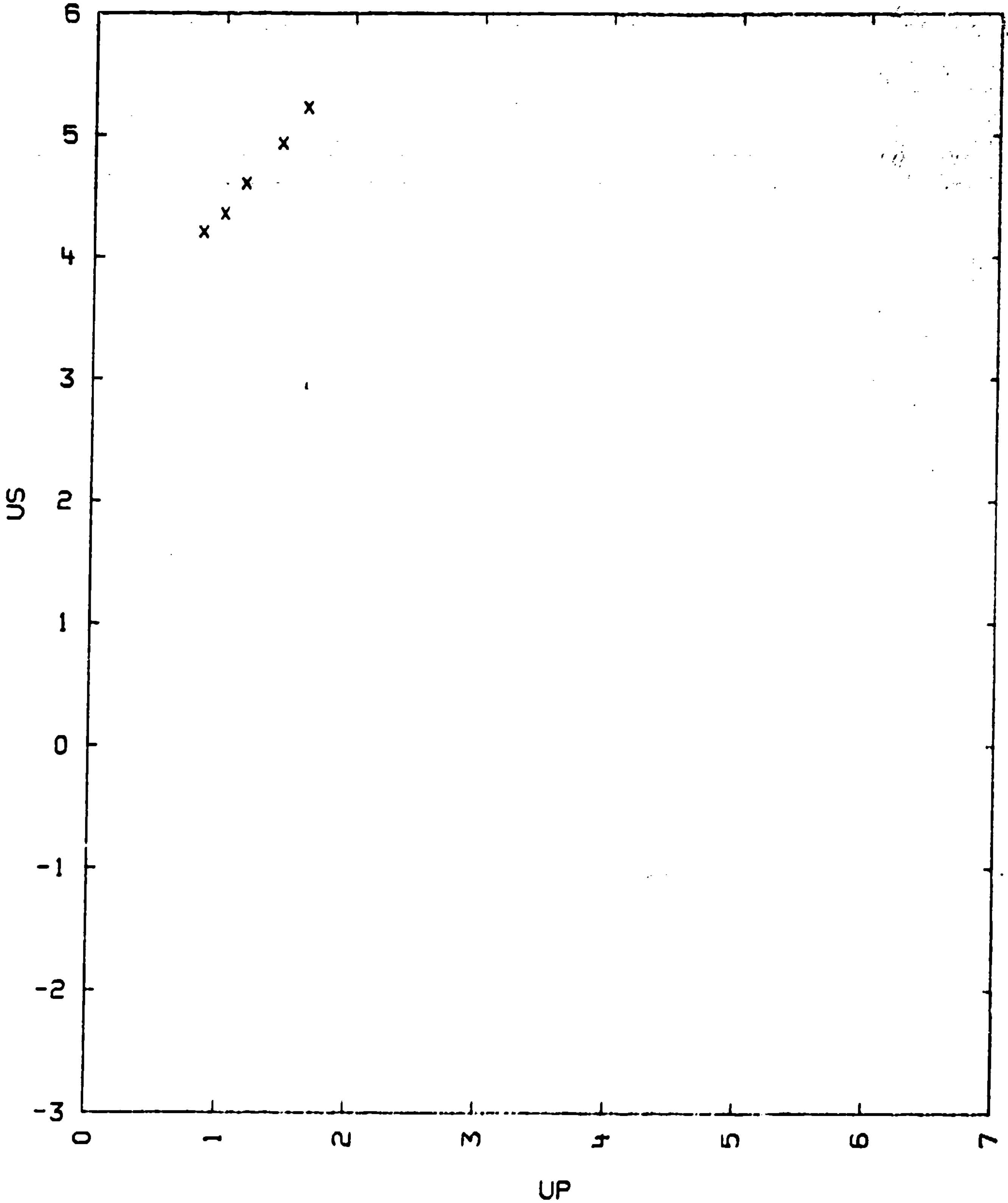
1) SOURCE: ILYUKIN V. S., POKHIL P. F., ROZANOV O. K. AND SHVEDOVA N. S.
DOKLADY AKAD NAUK SSSR VOL.131, P.793 (1960), OR
SOVIET PHYS. DOKLADY VOL.5, P.337 (1060) (ENGLISH)
2) EXPERIMENTAL METHOD A
DATA REDUCTION METHOD B STANDARD MATERIAL COPPER.

US	AND UP OF COPPER
5.60	1.00
5.34	0.87
5.03	0.71
4.82	0.60
4.64	0.51
4.32	0.35

3) THE ABOVE FIT YIELDS A PRESSURE OF 326 KB AT THE DETONATION VELOCITY WHILE PCJ = 210 KBARS
4) V01 WAS OBTAINED FROM THE HANDBOOK OF CHEM. AND PHYS. (CHEM. RUBBER PUBL. CO., CLEVELAND, OHIO, 1964) 45TH ED.

TABLE I

TRINITROTOLUENE (TNT EXPLOSIVE) (EXPLOSIVE)
23-18-2-1(7-3-5-6)---3



23-18-2-1(7-3-5-G)---4
TRINITROTOLUENE (TNT) (EXPLOSIVE)

C(C-H3)-C(N-O2)-(-C(H)-C(N-O2)-)2 = C7-N3-H5.06

V0 = 0.6078 CC/G   CL = 2.80 KM/SEC   C0 = 2.30 KM/SEC
V01= 0.6046 CC/G   CS = 1.38 KM/SEC

IN THE TABLE BELOW DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS. L IS SAMPLE THICKNES IN MM. AND PQ IS AN INDEPENDENT PRESSURE OBTAINED FROM A QUARTZ PRESSURE GAUGE (SEE COMMENTS). DELUS IS THE DIFFERENCE IN AVERAGE VELOCITY OF THE FOOT OF THE WAVE AND THE WAVE POINT CORRESPONDING TO THE LISTED PRESSURE

TABLE

RHO0	US	UP	P	V/V0	L	PQ	DELUS
1.647	2.732	0.0818	3.68	0.9701	6.2	3.40	0.41
1.643	2.496	0.0978	4.01	0.9608	-	4.54	0.25
1.647	2.787	0.1008	4.63	0.9638	-	4.33	0.20
1.645	2.345	0.1239	4.78	0.9472	-	4.91	0.23
1.647	2.778	0.1284	5.88	0.9539	-	5.75	0.10
1.644	2.405	0.1472	5.82	0.9388	-	6.74	0.21
1.648	2.733	0.1623	7.31	0.9406	-	8.22	0.18
1.645	2.805	0.1808	8.34	0.9356	12.7	8.68	0.12
1.647	2.919	0.2030	9.76	0.9305	6.2	10.65	0.11
1.644	2.844	0.2082	9.73	0.9268	-	9.26	0.12
1.645	2.751	0.2109	9.55	0.9234	-	9.58	0.13
1.645	2.903	0.2541	12.14	0.9125	-	12.47	0.10
1.645	2.997	0.3001	14.79	0.8999	6.2	14.26	0.04
1.646	3.036	0.3076	15.37	0.8987	-	14.87	0.05
1.646	3.141	0.3723	19.24	0.8815	-	20.20	0.06
1.645	3.150	0.3909	20.25	0.8759	-	19.61	0.10
1.646	3.375	0.4218	23.43	0.8750	12.7	23.21	0.06
1.647	3.344	0.4400	24.23	0.8684	12.7	24.70	0.07

US = 2.372 + 2.16*UP ABOVE UP = 0.19 KM/SEC.
SIGMA US = 0.064 KM/SEC.

COMMENTS:

1) SOURCE: WASLEY R. J. AND OBRIEN J. F.
PRIVATE COMMUNICATION (1966)
LAWRENCE RAD. LAB., LIVERMORE, CALIFORNIA, U. S. A.
2) EXPERIMENTAL METHOD: A AND 12
DATA REDUCTION METHOD: A
THE PRESSURE WAS PRODUCED BY IMPACTING TWO SAMPLES OF TNT, SO THAT UP = 1/2 PROJECTILE VELOCITY.
3) FURTHER WORK IS IN PROGRESS ON THIS MATERIAL
4) THE WIDTH OF MOST SHOCK FRONTS MAKES CHOICE OF THE APPROPRIATE SHOCK VELOCITY TO BE USED IN THIS SIMPLE ANALYSIS UNCERTAIN. THE VALUE OF US USED CORRESPONDS TO THE TIME AT WHICH THE QUARTZ GAUGE READS

1/2 OF PEAK VOLTAGE. IN THE OPINION OF THE COMPILER THIS DOES NOT MAKE THE VALUE OF US UNCERTAIN BY MORE THAN 5 PERCENT FOR THE WIDEST SHOCK IN THE TABLE. THE ACCURACY OF PO IS 5 PERCENT

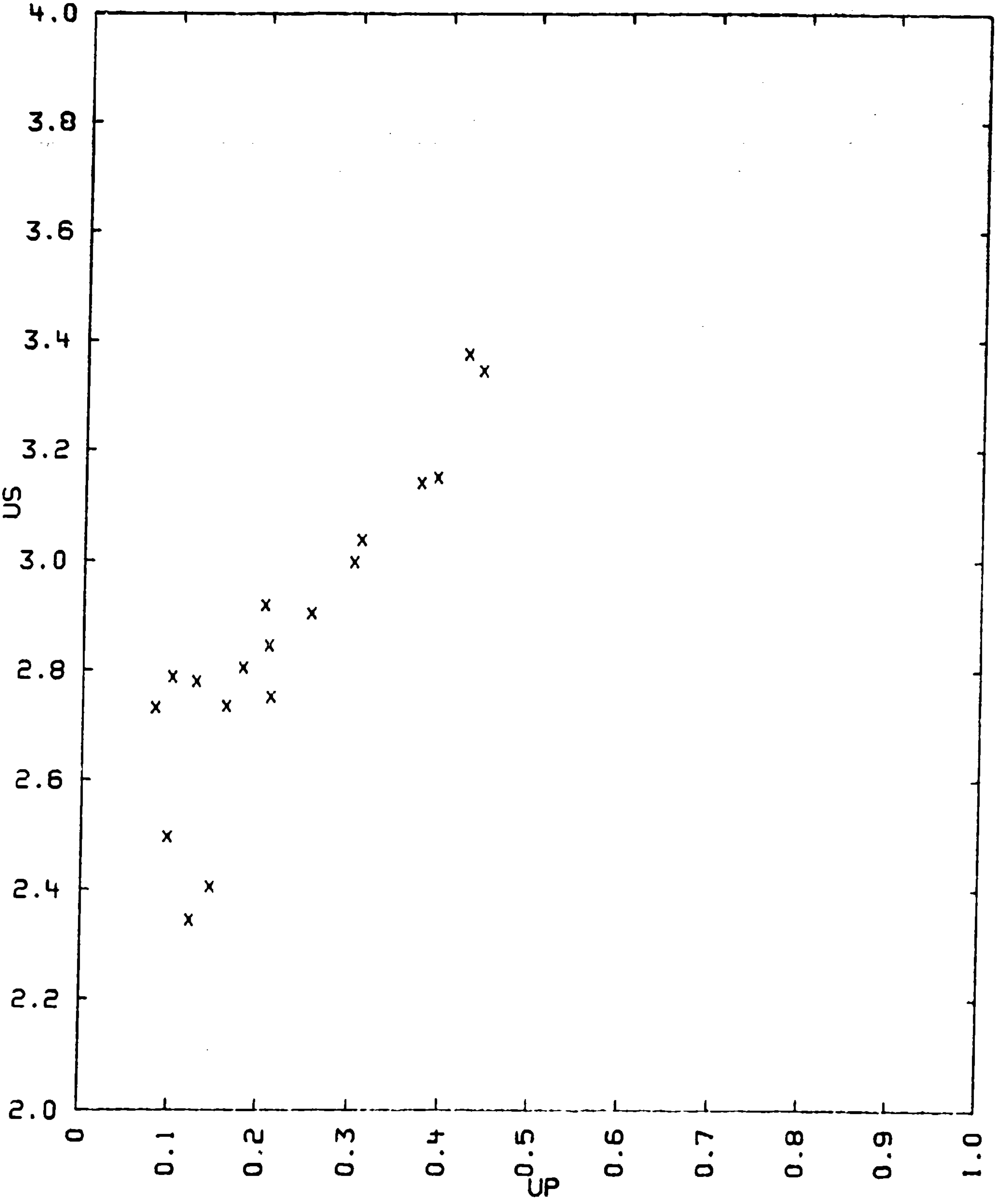
5) THE RELATIVELY LARGE DISCREPANCY OF THE THREE POINTS AT 4.10, 4.78 AND 5.82 KBARS IS AS YET NOT EXPLAINED. HOWEVER, NONE OF THE POINTS BELOW 9 KILOBARS WERE USED SINCE THE EFFECT OF THE POORLY DEFINED ELASTIC WAVE ON THESE EXPERIMENTS ADDS A FURTHER UNCERTAINTY

6) V01 WAS OBTAINED FROM THE HANDBOOK OF CHEM. AND PHYS. (CHEM. RUBBER PUBL. CO., CLEVELAND, OHIO, 1964) 45TH ED.

TABLE I

TRINITROTOLUENE (TNT) (EXPLOSIVE)

23-18-2-1(7-3-5-6)---4



23-18-2-1(7-3-5-8)---5
TNT (EXPLOSIVE)

TRINITROTOLUENE
(N-O2)3-C6(H2)-C-H3 = C7-N3-H5-O6

V0 = 0.6321 CC/G
V0I = 0.6046 CC/G

IN THE TABLE BELOW DENSITY IS GIVEN IN G/CC., VELOCITIES IN KM/SEC., AND PRESSURE IN KILOBARS. X DENOTES BRASS STANDARD THICKNESS IN CM.

TABLE

RHOO	X	US	UP	P	V/V0
1.582	1.270	4.89	1.395	107.9	0.715
-	2.492	4.65	1.275	93.8	0.726
-	3.762	4.47	1.145	81.1	0.744

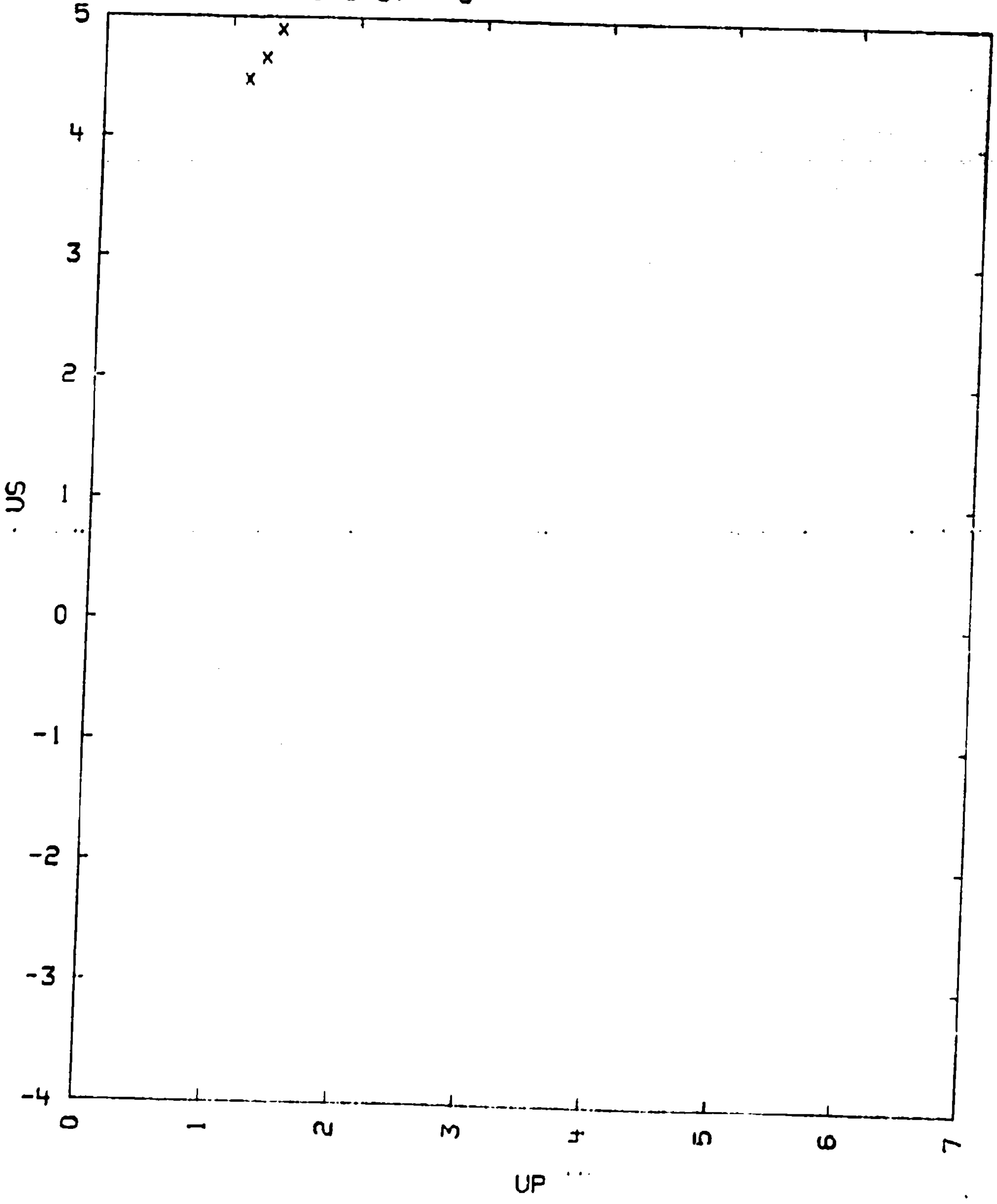
US = 2.52 + 1.69*UP +OR- 0.06 KM/SEC

COMMENTS:

1) SOURCE: MAJOWICZ, M. J. AND JACOBS, S. J.
NAVORD REPORT NO. 5700, 1958
U.S. NAVAL ORDNANCE LAB., WHITE OAK, MARYLAND, U.S.A.
2) EXPERIMENTAL TECHNIQUE C
DATA REDUCTION TECHNIQUE B. WHERE UP = 1/2(UFS). IT WAS ASSUMED THE RELEASE ISENTROPE WAS A STRAIGHT LINE WITH SLOPE RHOO(US).
STANDARD MATERIAL BRASS
3) US IS THE VELOCITY AT ZERO THICKNESS OF THE EXPLOSIVE OBTAINED BY EXTRAPOLATING THE VELOCITY VERSUS THICKNESS CURVE OBTAINED FROM A WEDGE OF EXPLOSIVE.
4) THE DETONATION VELOCITY IS 5.23 KM/SEC., SIGMA =0.015 KM/SEC
THIS VELOCITY WAS REACHED AT THICKNESS BETWEEN 4.3-10.7 MM DEPENDING ON INPUT PRESSURE.
5) V0I WAS CALCULATED BY USING THE WEIGHT PERCENT OF THE ELEMENTS.

TABLE I

TNT (EXPLOSIVE)
23-18-2-1(7-3-5-6)---5



23-18-2-1(7-3-5-6)---6
TRINITROTOLUENE (TNT) (EXPLOSIVE)

-C(C-H3)-C(N-O2)(-C(H)-C(N-O2)-)2 = C7-N3-H5-O6

VO = 0.621 CC/G
VOI = 0.6046 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UP	P	V/VO
1.610	3.83	0.77	47.5	0.799
-	3.84	0.76	47.0	0.802
-	4.63	1.10	82.0	0.762
-	4.49	1.12	80.9	0.751
-	4.60	1.11	82.2	0.759
-	3.78	0.76	46.3	0.799
-	3.46	0.56	31.2	0.838
-	3.59	0.55	31.8	0.847
-	3.31	0.49	26.1	0.852
-	3.36	0.49	26.5	0.854
-	3.65	0.54	31.7	0.852
-	3.45	0.56	31.1	0.838
-	4.42	1.06	75.4	0.760
-	4.22	1.04	70.7	0.754
-	4.53	1.02	74.4	0.775
-	4.15	0.79	52.8	0.809
-	3.51	0.56	31.6	0.840
-	3.36	0.57	30.8	0.830
-	4.53	1.04	75.9	0.770
-	4.42	1.05	74.7	0.762
-	4.39	1.05	74.2	0.761
-	4.40	1.06	75.1	0.759
-	3.51	0.56	31.6	0.840
-	4.01	0.80	51.6	0.800
-	4.94	1.28	101.8	0.741
-	3.39	0.57	31.1	0.832
-	3.99	0.85	54.6	0.787
-	5.25	1.31	110.7	0.750
-	3.52	0.56	31.7	0.841
-	4.04	0.85	55.3	0.789
-	5.13	1.33	109.8	0.741
-	3.71	0.84	50.2	0.774
-	3.99	0.83	53.3	0.792
-	4.73	1.15	87.6	0.757
-	4.11	0.82	54.3	0.800
-	4.61	1.16	86.1	0.748
-	4.80	1.17	90.4	0.756
-	4.77	1.17	89.9	0.755
-	4.63	1.19	88.7	0.743
-	4.24	0.83	56.7	0.804
-	4.15	0.84	56.1	0.798

TRINITROTOLUENE (TNT) (EXPLOSIVE)

RHOO	US	UP	P	V/VO
-	4.08	0.84	55.2	0.794
-	3.93	0.85	53.8	0.784

US = 2.34 + 2.03*UP KM/SEC
SIGMA US = 0.12 KM/SEC

COMMENTS:

1) SOURCE: BOYLE, V. M. AND ERVIN, L. H.
BRL MEMO. REPORT NO. 1814, JANUARY 1967
BALLISTIC RESEARCH LABORATORIES. AMXBR-TD
ABERDEEN PROVING GROUND, MARYLAND 21005.

2) EXPERIMENTAL TECHNIQUE: THE SHOCK VELOCITY IN THE SAMPLE WAS MEASURED BY A SMEAR CAMERA THAT SWEPT THE SHADOWGRAPH OF A TRANSPARENT CHANNEL IN THE SAMPLE ACROSS THE FILM PLANE. THE CHANNEL WAS MADE BY SPLITTING THE SAMPLE IN TWO ALONG THE SHOCK DIRECTION AND SEPARATING THE TWO HALVES BY A THIN (0.127 MM) TRANSPARENT PLASTIC SHEET (EXTRUDED ACETATE).

DATA REDUCTION TECHNIQUE: B
STANDARD MATERIALS USED:
ALUMINUM, 2024-T4, US = 5.360 + 1.351*UP KM/SEC
RHO = 2.785 G/CC
PLEXIGLASS,US = 2.702 + 1.544*UP, KM/SEC, RHO = 1.184 G/CC
UP = 1/2 UFS WAS ASSUMED FOR THE STANDARD MATERIALS SO THAT THE PRESSURE ISENTROPE COULD BE OBTAINED BY REFLECTING THE P VS. UP HUGONIOT IN THE LINE UP = 1/2 UFS.

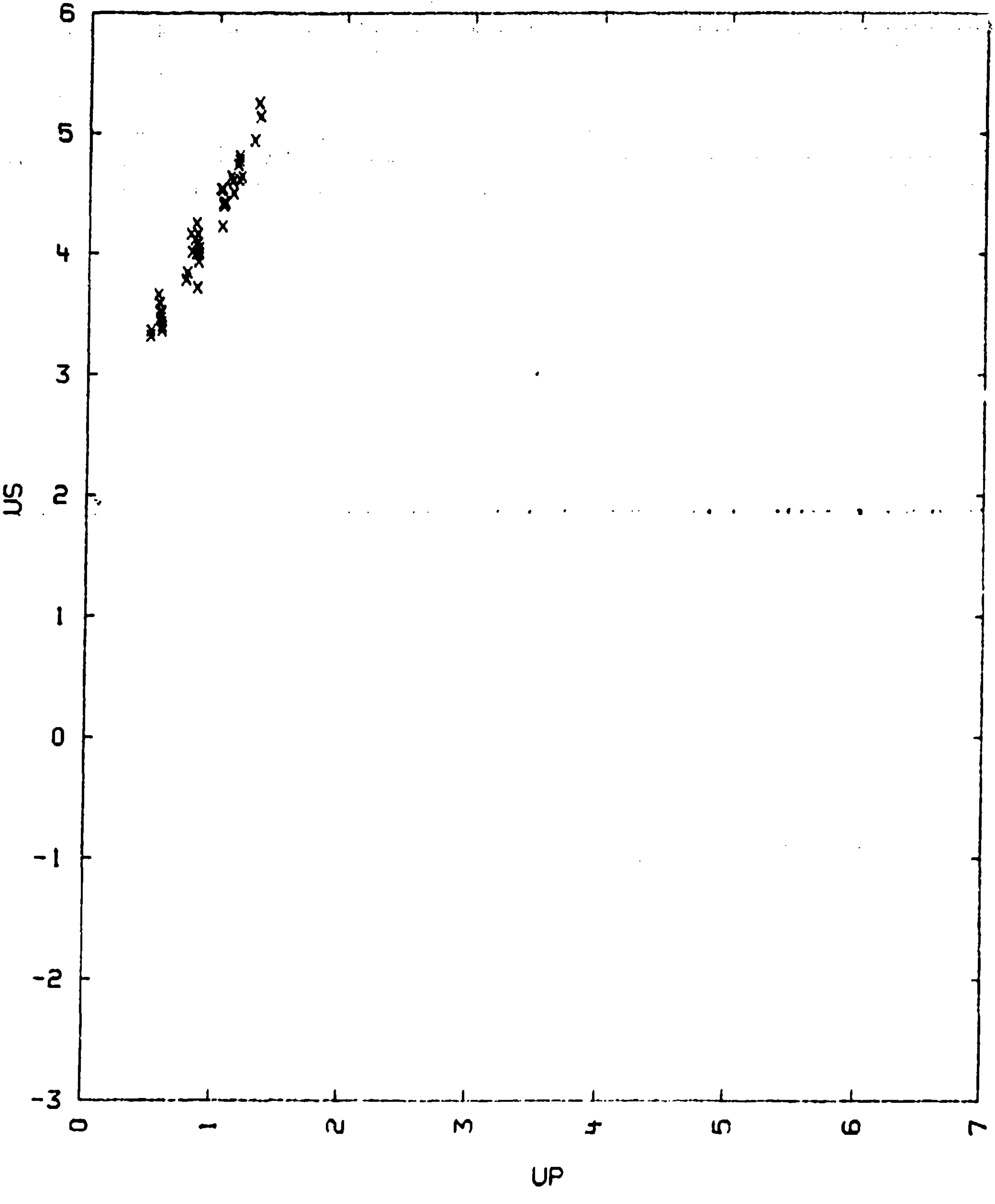
3) THE DEGREE TO WHICH THE RESULTS MAY BE AFFECTED BY CHEMICAL REACTION OF THE SHOCKED EXPLOSIVE SAMPLE HAS NOT BEEN DETERMINED AT THIS TIME.

4) VOI WAS OBTAINED FROM THE HANDBOOK OF CHEM. AND PHYS. (CHEM. RUBBER PUBL. CO. 1963) 44TH ED.

TABLE 1

TRINITROTOLUENE (TNT) (EXPLOSIVE)

23-18-2-1(7-3-5-6)---6



23-18-2-1(7-3-5-6)---7
TRINITROTOLUENE (TNT) (EXPLOSIVE)

-C(C-H3)-C(N-O2)-(-C(H)-C(N-O2)-)2 = C7-N3-H5-O6

V0 = 0.77 - 1.02 CC/G
V0I= 0.6046 -

THE TABLES LIST DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KBAR. FOR UNCERTAINTIES SEE COMMENTS. D IS STANDARD THICKNESS IN MM.

TABLE I

SAMPLE					STANDARD		
RHO0	US	UP	P	V1V0	UP	P	D
1.30	2.198	0.581	16.6	0.736	0.507	20.3	50.8
-	2.097	0.609	16.6	0.710	0.517	20.7	50.8
-	2.845	0.730	27.0	0.742	0 682	29.4	43.4

US = -1.00 + 5.27*UP KM/SEC

TABLE II

SAMPLE					STANDARD		
RHO0	US	UP	P	V1V0	UP	P	D
0.98	1.05	0.35	3.6	0.666	0.228	8.7	76.2
-	1.97	0.435	8.4	0.779	0.333	12.9	63.5
-	1.99	0.440	8.6	0.779	0.333	12.9	63.5
-	1.80	0.680	12.0	0.622	0.517	20.7	50.8
-	1.68	0.700	11.5	0.583	0.517	20.7	50.8
-	1.46	0.725	10.4	0.503	0.517	20.7	50.8
-	1.74	0.772	13.2	0.540	0.560	22.9	46.8
-	1.63	0.793	12.7	0.514	0.578	23.8	47.7
-	1.63	0.794	12.7	0.514	0.578	23.8	47.7
-	1.80	0.960	17.0	0.468	0.654	27.9	44.5
-	2.17	1.080	23.0	0.503	0.837	38.6	38.2
-	2.60	1.030	26.3	0.605	0.840	38.8	38.1
-	3.11	1.330	40.5	0.571	1.111	56.9	25.4
-	3.06	1.340	40.0	0.562	1.111	56.9	25.4
-	3.05	1.340	40.0	0.560	1.111	56.9	25.4
-	3.26	1.720	55.0	0.472	1.413	80.4	12.7
-	3.26	1.720	55.0	0.472	1.413	80.4	12.7

US = 0.749 + 1.513*UP KM/SEC
SIG US = 0.33 KM/SEC

COMMENTS:

1) SOURCE: ERKMAN J.O. AND EDWARDS D.J.
NAVAL ORDINANCE LABORATORY TECH. REP. NO. NOLTR 74-213 (1974)
NAVAL ORDINANCE LABORATORY, WHITE OAK, SILVER SPRING,
MD. 20910, USA.

2) EXPERIMENTAL TECHNIQUE: KI
DATA REDUCTION METHOD : B
THE POLYMETHYLMETHACRYLATE STANDARD IS A CYLINDER OF DIAMETER 50.8 MM., LENGTH D, SHOCK HUGONIOTS US = 2.561 + 1.595*UP (UP AT OR ABOVE 0.536 KM/SEC.) AND US = 2.7228 + 4.0667*UP - 10.9051 *UP**2 + 10.691*UP**3 KM/SEC (UP LESS THAN 0.536), RHO0 = 1.185 G/CC. DATA OF BARKER L.M. AND HOLLENBACH (J. APPL. PHYS. V.41, 4208 (1970)) AND OF SCHULER K.W. AND NUNZIATO J.W. (SIXTH INTERNATIONAL CONGRES OF RHEOLOGY, LYON FRANCE (1972)) ON THE RELEASE CURVES WHERE FITTED TO A FUNCTION=F(RHO/RHO0) AND CONVERTED TO THE P UP PLANE USING THE RIEMAN INTEGRAL AND THE CONDITION THAT U=UP ON THE HUGONIOT. THE HUGONIOT UP VALUES ARE GIVEN BY
UP = 1.7735*EXP(-0.01841*D) + 0.8765*EXP(-0.3495*D) (D < 36 MM)
UP = 0.0905 + 4.0877*EXP(-0.04451*D) (D > 36 MM)
FOR THE 50.8 MM LONG CYLINDER OF 50/50 PENTOLITE BOOSTER CHARGE USED.

3) THE EXPERIMENTAL ERROR IN UP IS 3 PERCENT AND REFLECTS ITSELF IN A 12 PERCENT UNCERTAINTY IN P AND A 0.05 TO 0.06 CC/G UNCERTAINTY IN V.

4) THE DATA AGREES WITH THE HUGONIOT CALCULATED FROM THE IDEAL DENSITY TNT SHOCK LOCUS ASSUMING EQUILIBRIUM THERMODYNAMICS. A GRUNEISEN EOS WITH GAMMA = 0.737 AND A NONPOROUS (RHO0= 1.614 G/CC) HUGONIOT (US = 2.39 + 2.05*UP KM/SEC) WAS USED IN THESE CALCULATIONS

5) V0I IS TAKEN FROM THE HANDBOOK OF CHEM. AND PHYS (CHEMICAL RUBBER CO., CLEVELAND, OHIO. (1969-70)) 50TH ED.

TABLE I

TRINITROTOLUENE (TNT) (EXPLOSIVE)

23-18-2-1(7-3-5-6)---7

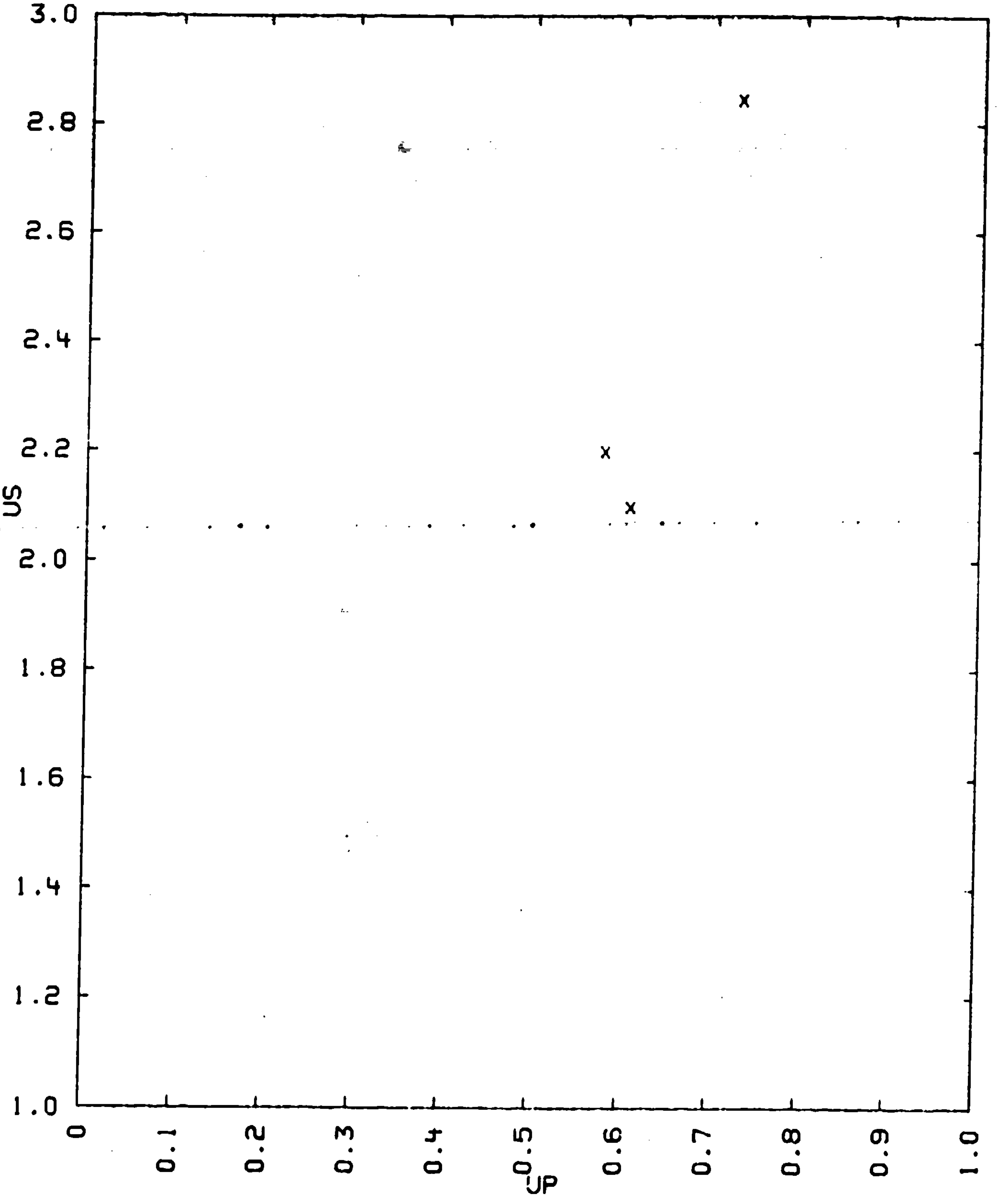
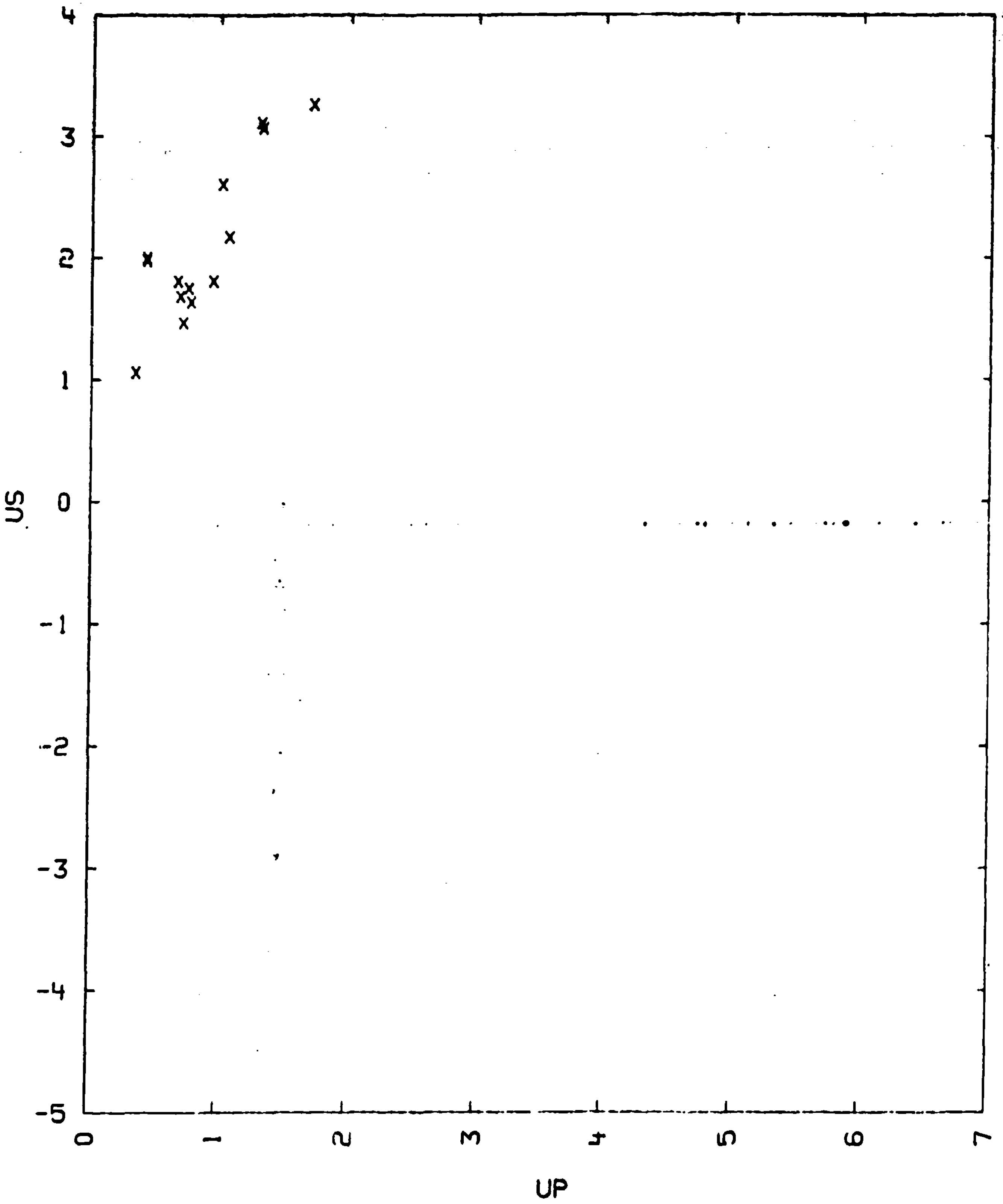


TABLE II

TRINITROTOLUENE (TNT) (EXPLOSIVE)

23-18-2-1(7-3-5-6)---7



23-18-2-1(200-6-224-28)---1
EPOXY RESIN (EPON 828)

BISPHENOL-A -EPICHLOROHYDRIN RESIN: C200-H222-034			83.3	WT. PERCENT
CURING AGENT :			16.7	- -
METAPHENYLENEDIAMINE	C6(H4)-(N(H2))2	17		- -
METHYLENEDIANILINE	((H2)N-C6(H4)-C(H2)-)2	81		- -
PHENYLGLYCIDYLETHER	C6(H5)-O-C(H2)-C2(H3)-O2	2		- -

VO = 0.833 CC/G   CL = 2.70 KM/SEC.

THE TABLE LISTS DENSITY IN G/CC., VELOCITIES IN KM/SEC. AND PRESSURE IN KBAR. M.T. IS THE MEASURING TECHNIQUE FURTHER DELINIATED IN COMMENT 2.

TABLE

RHOO	US	UP	P	V/VO	M.T.
1.20	2.76	0.065	2.15	0.976	DI
1.20	2.78	0.089	2.95	0.968	DI
1.20	2.84	0.111	3.78	0.961	DI
1.20	3.00	0.185	6.67	0.938	DI
1.20	3.01	0.238	8.59	0.921	DI
1.20	3.18	0.307	11.70	0.903	DI
1.20	3.24	0.371	14.40	0.885	DI
1.20	3.39	0.467	18.90	0.862	DI
1.20	2.83	0.106	3.61	0.962	TR
1.20	2.83	0.110	3.74	0.961	TR
1.20	3.04	0.234	8.55	0.923	TR
1.20	3.04	0.246	8.96	0.919	TR
1.20	3.24	0.372	14.45	0.885	TR
1.20	3.24	0.391	15.19	0.879	TR

US = 2.67 + 1.55*UP KM/SEC
SIG.US = 0.03 KM/SEC.

COMMENTS:

1) SOURCE: GUESS, T. R.
SANDIA LABORATORY REPORT, SC-DR-68-343 (1968)
SANDIA LABORATORY, ALBUQUERQUE, NEW MEXICO, U.S.A.

2) EXPERIMENTAL TECHNIQUE: 12 AND A
IN THE TABLE DI LABELS EXPERIMENTS IN WHICH THE SAMPLE WAS IMPACTED BY AN X-CUT QUARTZ CRYSTAL. HERE P AND US WERE MEASURED
TR LABELS EXPERIMENTS WHERE A HARDENED STEEL (ALLOY 4340 RC-54) PROJECTILE WAS USED. HERE P,US AND BULLET VELOCITY WERE MEASURED
WITH THIS REDUNDANCY OF INFORMATION AND THE STEEL HUGONIOT TWO P,V,UP POINTS WERE DETERMINED PER EXPERIMENT, INDICATING THE ACCURACY

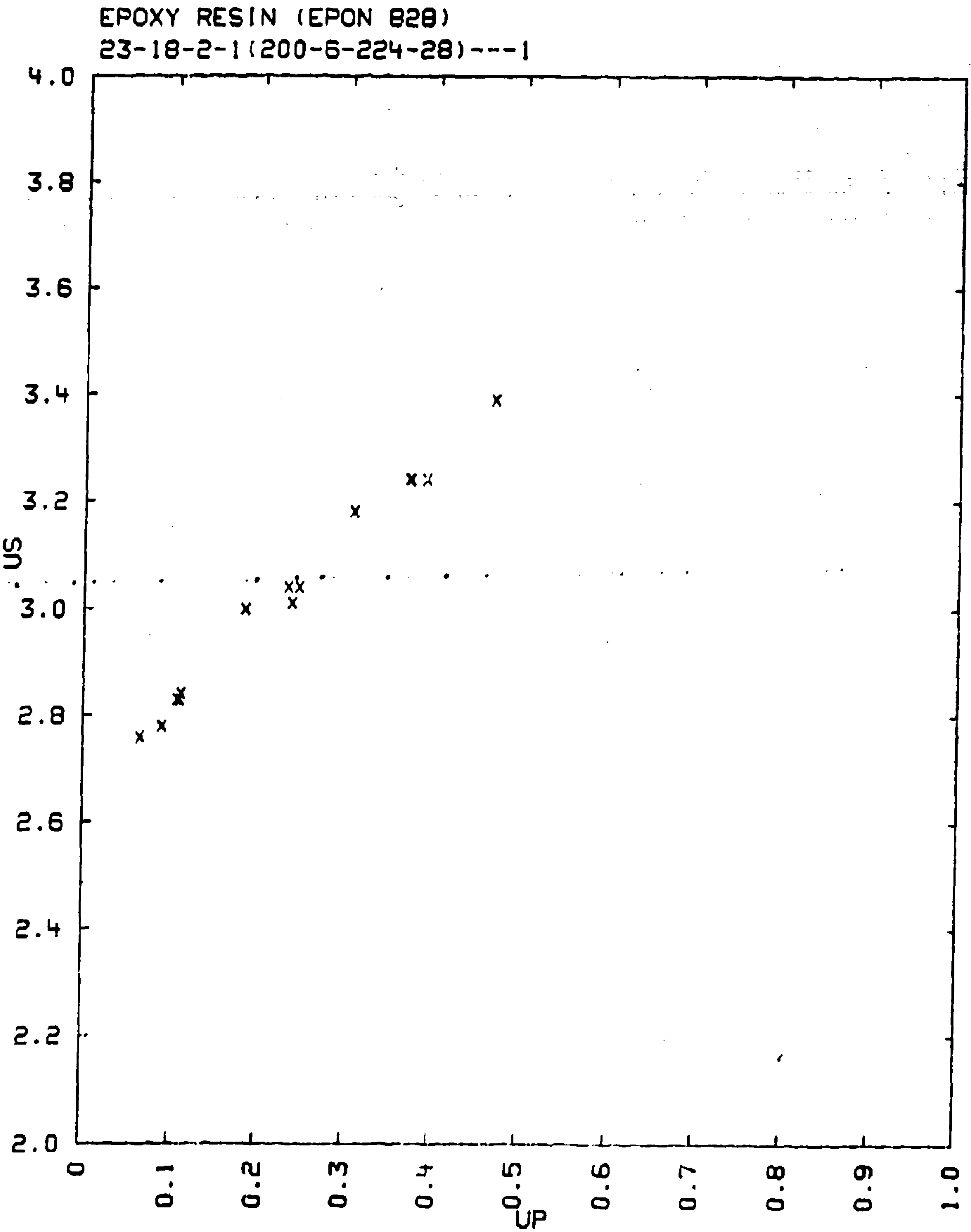
DATA REDUCTION TECHNIQUE: A AND C

3) UNCERTAINTIES IN THE MEASURED PARAMETERS ARE:
SIG US = 2 PERCENT

SIG P = 3.4 -
SIG U = 1 - U IS THE BULLET VELOCITY.
NO WAVE ATTENUATION WAS OBSERVED, UNLIKE IN PLEXIGLAS

4) THIS POLYMER IS A CONDENSATION PRODUCT OF BISPHENOL-A AND EPICHLORO-HYDRIN HARDENED WITH THE LISTED CURING AGENT. THE MOLECULAR COMPOSITION OF THE UNHARDENED RESIN IS OBTAINED BY TAKING 10 TO 20 MONOMER UNITS IN THE CHAIN. THE CURING AGENT COMPOSITION WAS OBTAINED USING THE ABOVE MOLECULAR CONTENT (SANDIA STANDARD 4604085, P.2) AND A CHEMICAL ANALYSIS:
C - 78.7, H - 5.4, N - 15.4 AND O - 0.5 WT. PERCENT
THE CURED PLASTIC CONSISTING OF 100 PARTS RESIN AND 20 PARTS CURING AGENT YIELDED:
C - 75.3, H - 6.7, N - 2.6 AND O - 15.5 WT. PERCENT
KEN WISHMANN, SANDIA LABORATORY.
THE RESIN STRUCTURE IS DESCRIBED BY I SKEIST, HANDBOOK OF ADHESIVES (REINHOLD PUBL. CORP., N.Y., 1962) P. 323 FF.

TABLE I


EPOXY RESIN (EPON 828)
23-18-2-1(200-6-224-28)---1
4.0
3.8
3.6
3.4
3.2
3.0
2.8
2.6
2.4
2.2
2.0
US
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
UP

23-18-2-1(200-10-286-33)---1
EPOXY

EPON 815: NOTE 3
BPA-EPI RESIN (C18-H22-03)N 79.2 WT PERCENT
BUTYLGLYCIDYL ETHER C7-H14-02 10.8 WT PERCENT
DIETHYLENETRIAMINE H-N(-C(H2)-CCH2)-N-H2)2 10. WT PERCENT

V0 = 0.8446 CC/G CL = 2.87 KM/SEC CO = 2.30 - 2.19 KM/SEC
CS = 1.48 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

SAMPLE					STANDARD	
RHO0	US	UP	P	V/VO	MATERIAL	US(ST)
1.184	3.26	0.37	14.	0.8865	CU	4.24
1.184	3.35	0.41	16.	0.8776	2024 AL	5.67
1.184	3.42	0.49	20.	0.8567	2024 AL	5.75
1.184	3.80	0.64	29.	0.8316	CU	4.47
1.184	3.71	0.70	31.	0.8113	2024 AL	5.93
1.184	3.80	0.72	32.	0.8105	2024 AL	5.94
1.184	3.70	0.74	32.	0.8000	2024 AL	5.96
1.184	3.72	0.78	34.	0.7903	2024 AL	6.00
1.184	4.31	0.92	47.	0.7865	CU	4.72
1.184	4.17	0.93	46.	0.7770	2024 AL	6.14
1.184	4.22	0.96	48.	0.7725	CU	4.75
1.184	4.19	0.96	48.	0.7709	CU	4.75
1.184	4.09	0.99	48.	0.7579	2024 AL	6.19
1.184	4.48	1.15	61.	0.7433	CU	4.92
1.184	4.56	1.19	64.	0.7390	CU	4.96
1.184	4.57	1.19	64.	0.7396	CU	4.96
1.198	4.54	1.21	66.	0.7335	2024 AL	6.41
1.198	4.53	1.22	66.	0.7307	2024 AL	6.41
1.184	4.74	1.34	75.	0.7173	2024 AL	6.53
1.184	4.74	1.36	76.	0.7131	2024 AL	6.55
1.184	4.68	1.42	79.	0.6966	2024 AL	6.60
1.198	5.24	1.70	107.	0.6756	2024 AL	6.88
1.198	5.24	1.70	107.	0.6756	2024 AL	6.88
1.198	5.24	1.70	107.	0.6756	2024 AL	6.88
1.184	5.30	1.70	107.	0.6792	CU	5.41
1.184	5.37	1.72	109.	0.6797	CU	5.42
1.184	5.36	1.73	110.	0.6772	2024 AL	6.91
1.184	5.33	1.75	110.	0.6717	2024 AL	6.92
1.184	5.35	1.80	114.	0.6636	2024 AL	6.97
1.184	5.33	1.81	114.	0.6604	CU	5.50
1.184	5.63	1.89	126.	0.6643	CU	5.58
1.198	6.12	2.25	165.	0.6324	2024 AL	7.43
1.198	6.09	2.25	164.	0.6305	2024 AL	7.43
1.184	6.34	2.36	177.	0.6278	2024 AL	7.54
1.184	6.28	2.39	178.	0.6194	2024 AL	7.57

EPOXY

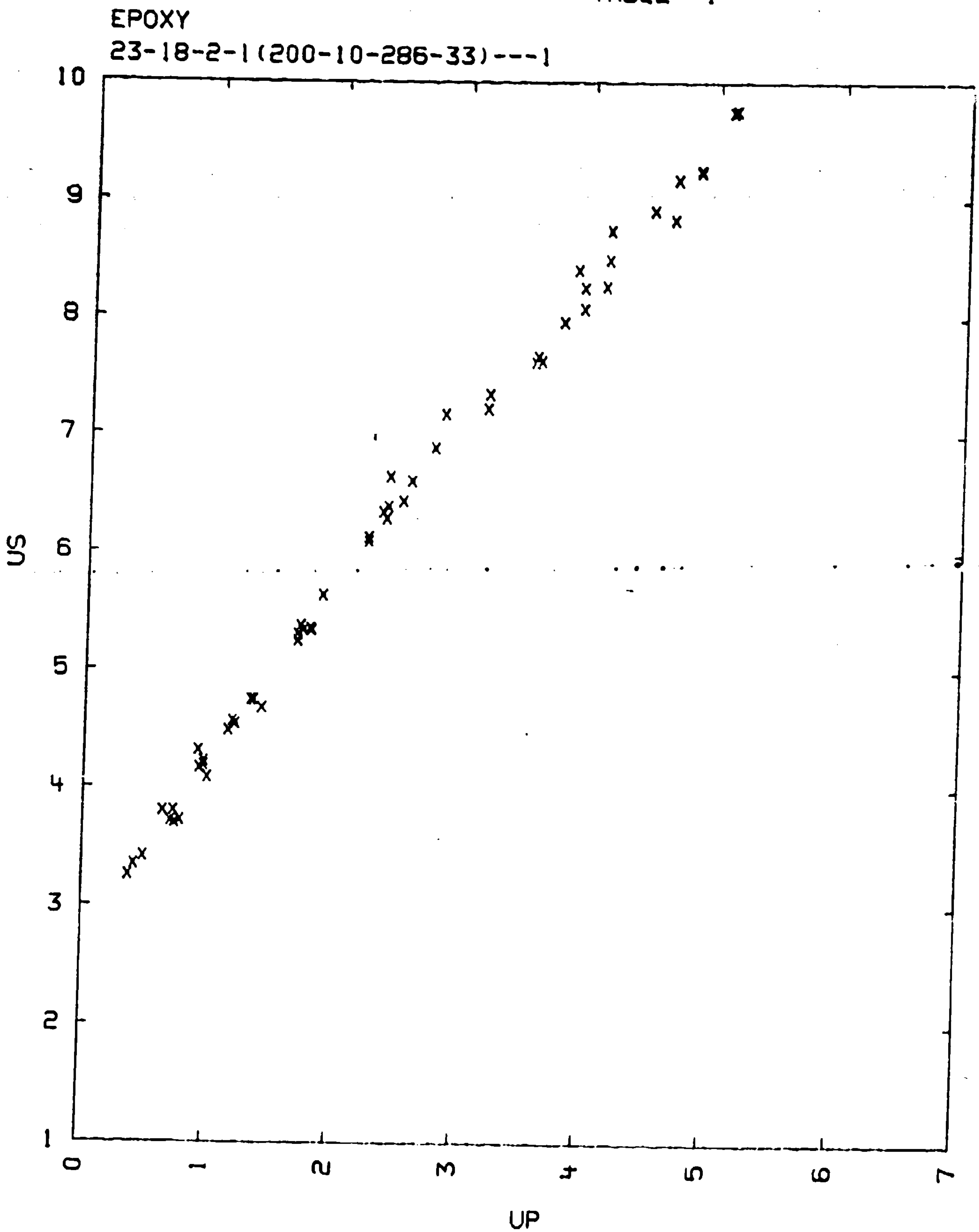
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
1.184	6.38	2.40	181.	0.6238	2024 AL	7.58
1.184	6.63	2.41	189.	0.6365	2024 AL	7.61
1.184	6.43	2.52	192.	0.6081	CU	6.15
1.184	6.60	2.58	202.	0.6091	2024 AL	7.76
1.184	6.88	2.76	225.	0.5988	2024 AL	7.95
1.184	7.17	2.84	241.	0.6039	CU	6.46
1.184	7.21	3.18	271.	0.5589	CU	6.75
1.184	7.34	3.19	277.	0.5654	2024 AL	8.38
1.184	7.61	3.56	321.	0.5322	2024 AL	8.74
1.184	7.65	3.58	324.	0.5320	2024 AL	8.76
1.184	7.62	3.61	326.	0.5262	CU	7.13
1.184	7.95	3.78	356.	0.5245	CU	7.30
1.184	8.39	3.89	386.	0.5364	CU	7.42
1.184	8.24	3.95	385.	0.5206	2024 AL	9.16
1.184	8.06	3.95	377.	0.5099	CU	7.45
1.181	8.26	4.12	402.	0.5012	CU	7.60
1.181	8.48	4.14	415.	0.5118	CU	7.64
1.184	8.73	4.15	429.	0.5246	2024 AL	9.39
1.184	8.90	4.49	473.	0.4955	2024 AL	9.72
1.184	8.82	4.65	486.	0.4728	CU	8.13
1.184	9.16	4.68	508.	0.4891	CU	8.14
1.198	9.25	4.86	539.	0.4746	2024 AL	10.10
1.198	9.23	4.86	537.	0.4735	2024 AL	10.10
1.184	9.74	5.10	588	0.4764	2024 AL	10.36
1.184	9.76	5.13	593.	0.4744	2024 AL	10.39

US = 2.632 + 1.664*UP - 0.060*UP**2 KM/SEC
SIG US = 0.13 KM/SEC
OR
US = 2.682 +1.532*UP KM/SEC FOR UP BELOW 3 KM/SEC
SIG US = 0.09 KM/SEC
AND
US = 3.221 + 1.258*UP KM/SEC FOR UP ABOVE 3 KM/SEC
SIG US 0.14 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B
3) THE COMPOSITION WAS ASSUMED TO BE THE SAME AS THAT GIVEN FOR THE EPOXY RESIN IN THE MIXTURE CU-O--EPOXY = 36-1--23-18-2-1 (200-10-286-33)---1 GIVEN BY THIS SOURCE. NOTE SIMILARITY TO THE OTHER EPOXY LISTED ABOVE: 23-18-2-1(200-6-224-28)---1 SEE ALSO MODERN PLASTICS ENCYCLOPEDIA (MC GRAW HILL, N.Y., 1975) VOL. 51, NO. 10A
4) V(DP/DE) = 1.13

TABLE I



23-18-2-1(200-16-286-79)---1
POLYURETHANE

(C200-N16-H286-079)N   99.9 WT PERCENT

V0 = 0.7905 CC/G   C0 = 2.07 KM/SEC

IN THE TABLE BELOW, DENSITY IS GIVEN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UP	P	V/VO
1.265	4.215	1.119	596.7	0.7345
-	4.198	1.120	594.8	0.7332
-	4.562	1.345	776.2	0.7052
-	4.549	1.346	774.6	0.7041
-	5.278	1.786	119.3	0.6616
-	5.279	1.786	119.3	0.6617
-	6.033	2.246	171.4	0.6277
-	5.986	2.251	170.5	0.6240
-	6.430	2.505	203.8	0.6104
-	6.409	2.507	203.3	0.6088
-	6.551	2.606	216.0	0.6022
-	6.539	2.607	215.7	0.6013
-	6.776	2.761	236.7	0.5925
-	6.749	2.764	234.0	0.5905
-	6.844	2.824	244.5	0.5874
-	7.719	3.483	340.1	0.5488
-	7.698	3.485	339.4	0.5473
-	8.543	4.335	468.5	0.4926
-	8.534	4.337	468.2	0.4918

US = 1.989 + 2.101*UP - 1.351*UP**2 +OR- 0.05 KM/SEC

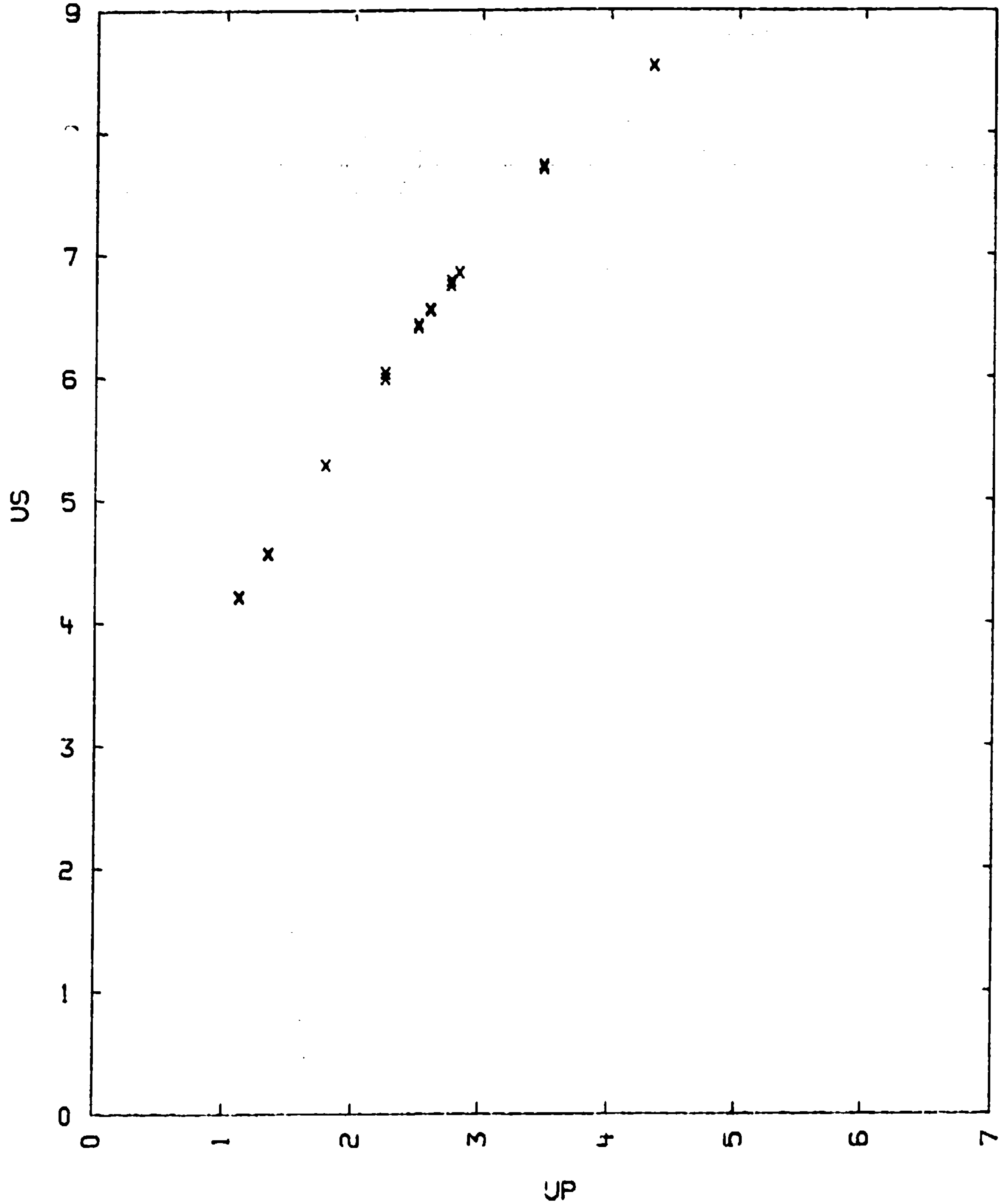
COMMENTS:

1) SOURCE: CARTER, W. J., MARSH, S. P. AND MCQUEEN, R. G.
PRIVATE COMMUNICATION (1967)
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B
STANDARD MATERIAL 2024 ALUMINUM.
3) C0 WAS GIVEN BY THE AUTHORS.
4) THE POLYMER WAS MADE BY MIXING TWO PARTIALLY POLYMERISED MIXTURES:
R MIXTURE: ADIPIC ACID H-O2-C(C-H2)4-C-O2-H
DIETHYLENE GLYCOL (H-O-C(H2)-C(H2))2-O
TRYMETHYLOL PROPANE H3-C(H2)-C(C(H2)-O-H
ACID NO.: 1.2 +OR-0.2
OH NO.: 320 +OR-10
WEIGHT RATIO : C/H/O = 55.9/8.3/35.8
WATER : LESS THAN 0.05 PERCENT
T MIXTURE: TOLUENEDIISOCIANATE : H3-C(C6-H3)(N-C-O)2

RESIN
AMENE EQUIVALENT : 129 +OR- 2 GRAMS
WEIGHT RATIO : C/H/N/O = 60.2/4.5/12.6/22.7
POLYMER : WEIGHT RATIO : C/H/N/O/(ASH+CL)= 57.44/6.90/5.43/30.10/0.1

TABLE I

POLYURETHANE
23-18-2-1(200-16-286-79)---1



23-18-2-1(200-16-286-79)---2
POLYURETHANE

C200-N16-H286-O79

VO = 0.7905 CL = 2.39 KM/SEC CO = 2.07 KM/SEC
CS = 1.03 KM/SEC

IN THE TABLES BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBAR AND DENSITY IN G/CC.

TABLE I

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
1.265	4.15	1.05	55.	0.7470	2024 AL	6.26
1.265	4.14	1.05	55.	0.7464	2024 AL	6.26
1.265	4.50	1.28	73.	0.7156	2024 AL	6.48
1.265	4.48	1.28	73.	0.7143	2024 AL	6.48
1.265	5.20	1.71	112.	0.6712	2024 AL	6.91
1.265	5.20	1.71	112.	0.6712	2024 AL	6.91
1.265	5.95	2.17	163.	0.6353	2024 AL	7.38
1.265	5.90	2.18	163.	0.6305	2024 AL	7.38
1.265	6.34	2.43	195.	0.6167	2024 AL	7.64
1.265	6.32	2.43	194.	0.6155	2024 AL	7.64
1.265	6.46	2.53	207.	0.6084	2024 AL	7.74
1.265	6.44	2.53	206.	0.6071	2024 AL	7.74
1.265	6.68	2.68	226.	0.5988	2024 AL	7.90
1.265	6.65	2.68	225.	0.5970	2024 AL	7.90
1.265	6.75	2.74	234.	0.5941	2024 AL	7.97
1.265	7.61	3.39	326.	0.5545	2024 AL	8.64
1.265	7.59	3.40	326.	0.5520	2024 AL	8.64
1.265	8.42	4.15	442.	0.5071	2024 AL	9.42
1.265	8.42	4.15	442.	0.5071	2024 AL	9.42
1.265	9.28	4.76	559.	0.4871	2024 AL	10.08
1.265	9.20	4.78	556.	0.4804	2024 AL	10.08

US = 2.486 + 1.577*UP KM/SEC FOR UP BELOW 2.6
SIG US = 0.024 KM/SEC
US = 3.423 + 1.216*UP KM/SEC FOR UP ABOVE 2.6 KM/SEC
SIG US = 0.05 KM/SEC

TABLE II

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
0.476	2.34	1.62	18.	0.3077	2024 AL	6.48
0.381	2.55	1.62	16.	0.3647	2024 AL	6.48
0.355	3.13	2.15	24.	0.3131	2024 AL	6.86

US = 0.351 + 1.292*UP KM/SEC

POLYURETHANE

RHOO	US	UP	P	V/VO	MATERIAL	US(ST)

SIGMA US = 0.148 KM/SEC

TABLE III

-----SAMPLE-----					-----STANDARD-----	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
0.310	2.52	1.68	13.	0.3333	2024 AL	6.51
0.339	3.12	2.15	23.	0.3109	2024 AL	6.86
0.308	3.21	2.16	21.	0.3271	2024 AL	6.86
0.333	3.25	2.16	23.	0.3354	2024 AL	6.87
0.319	3.88	2.72	34.	0.2990	2024 AL	7.29
0.320	3.68	2.74	32.	0.2554	2024 AL	7.29
0.315	3.75	2.74	32.	0.2693	2024 AL	7.29

US = 0.712 + 1.127*UP KM/SEC
SIGMA US = 0.100 KM/SEC

TABLE IV

-----SAMPLE-----					-----STANDARD-----	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
0.289	3.33	2.19	21.	0.3423	2024 AL	6.88
0.267	3.08	2.21	18.	0.2825	2024 AL	6.88
0.250	3.05	2.22	17.	0.2721	2024 AL	6.88
0.296	3.79	2.75	31.	0.2744	2024 AL	7.29
0.286	3.75	2.85	31.	0.2400	2024 AL	7.36
0.285	3.78	2.86	31.	0.2434	2024 AL	7.36
0.282	3.78	2.86	30.	0.2434	2024 AL	7.36
0.273	3.68	2.87	29.	0.2201	2024 AL	7.36
0.285	4.00	2.87	33.	0.2825	2024 AL	7.38
0.289	4.00	2.87	33.	0.2825	2024 AL	7.38

US = 0.868 + 1.038*UP KM/SEC
SIGMA US = 0.136 KM/SEC

TABLE V

-----SAMPLE-----					-----STANDARD-----	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
0.145	2.23	1.73	6.	0.2242	2024 AL	6.51
0.150	2.26	1.74	6.	0.2301	2024 AL	6.51
0.149	2.26	1.74	6.	0.2301	2024 AL	6.51
0.147	2.23	1.74	6.	0.2197	2024 AL	6.52
0.145	2.24	1.75	6.	0.2187	2024 AL	6.52

POLYURETHANE

RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
0.159	2.95	2.21	10.	0.2508	2024 AL	6.85
0.159	3.06	2.22	11.	0.2745	2024 AL	6.86
0.157	3.01	2.22	10.	0.2625	2024 AL	6.86
0.149	2.94	2.23	10.	0.2415	2024 AL	6.86
0.202	3.06	2.23	14.	0.2712	2024 AL	6.88
0.178	3.75	2.88	19.	0.2320	2024 AL	7.33
0.158	3.74	2.88	17.	0.2299	2024 AL	7.32
0.160	3.78	2.98	18.	0.2116	2024 AL	7.39
0.175	3.66	2.98	19.	0.1858	2024 AL	7.39
0.156	3.63	2.98	17.	0.1791	2024 AL	7.38
0.159	3.68	3.00	18.	0.1848	2024 AL	7.40
0.159	3.61	3.01	17.	0.1662	2024 AL	7.40

US = 0.328 + 1.148*UP KM/SEC
SIGMA US = 0.119 KM/SEC

TABLE VI

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
0.107	2.30	1.73	4.	0.2478	2024 AL	6.50
0.107	2.32	1.77	4.	0.2371	2024 AL	6.53
0.093	2.97	2.26	6.	0.2391	2024 AL	6.86
0.098	3.00	2.26	7.	0.2467	2024 AL	6.87
0.095	2.87	2.27	6.	0.2091	2024 AL	6.87
0.091	2.92	2.29	6.	0.2158	2024 AL	6.88
0.099	3.41	3.05	10.	0.1056	2024 AL	7.40
0.094	3.37	3.05	10.	0.0950	2024 AL	7.40
0.077	3.36	3.07	8.	0.0863	2024 AL	7.40
0.081	3.49	3.07	9.	0.1203	2024 AL	7.41
0.077	3.39	3.08	8.	0.0914	2024 AL	7.41

US = 1.109 + 0.760*UP KM/SEC
SIGMA US = 0.109 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B (STANDARD BASE PLATE AS SHOWN)
3) THE NONPOROUS SAMPLES WERE FROM THE C.P.R. INTERNATIONAL CORP. THE FOAMS WERE PRODUCED AT THE LOS ALAMOS LABORATORY IN NEW MEXICO
4) V(DP/DE) = 1.55

TABLE I

POLYURETHANE
23-18-2-1(200-16-286-79)---2

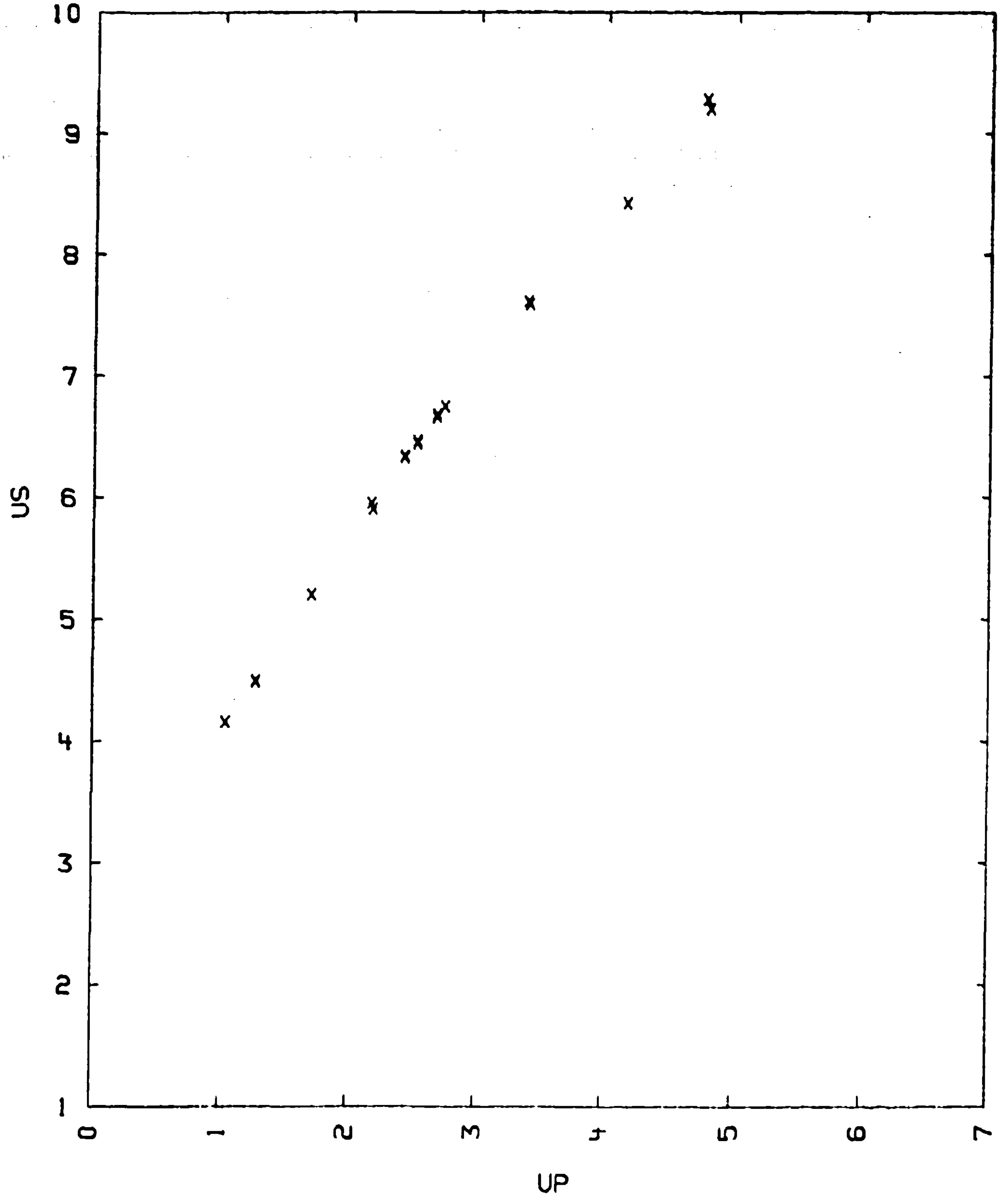


TABLE II

POLYURETHANE
23-18-2-1(200-16-286-79)---2

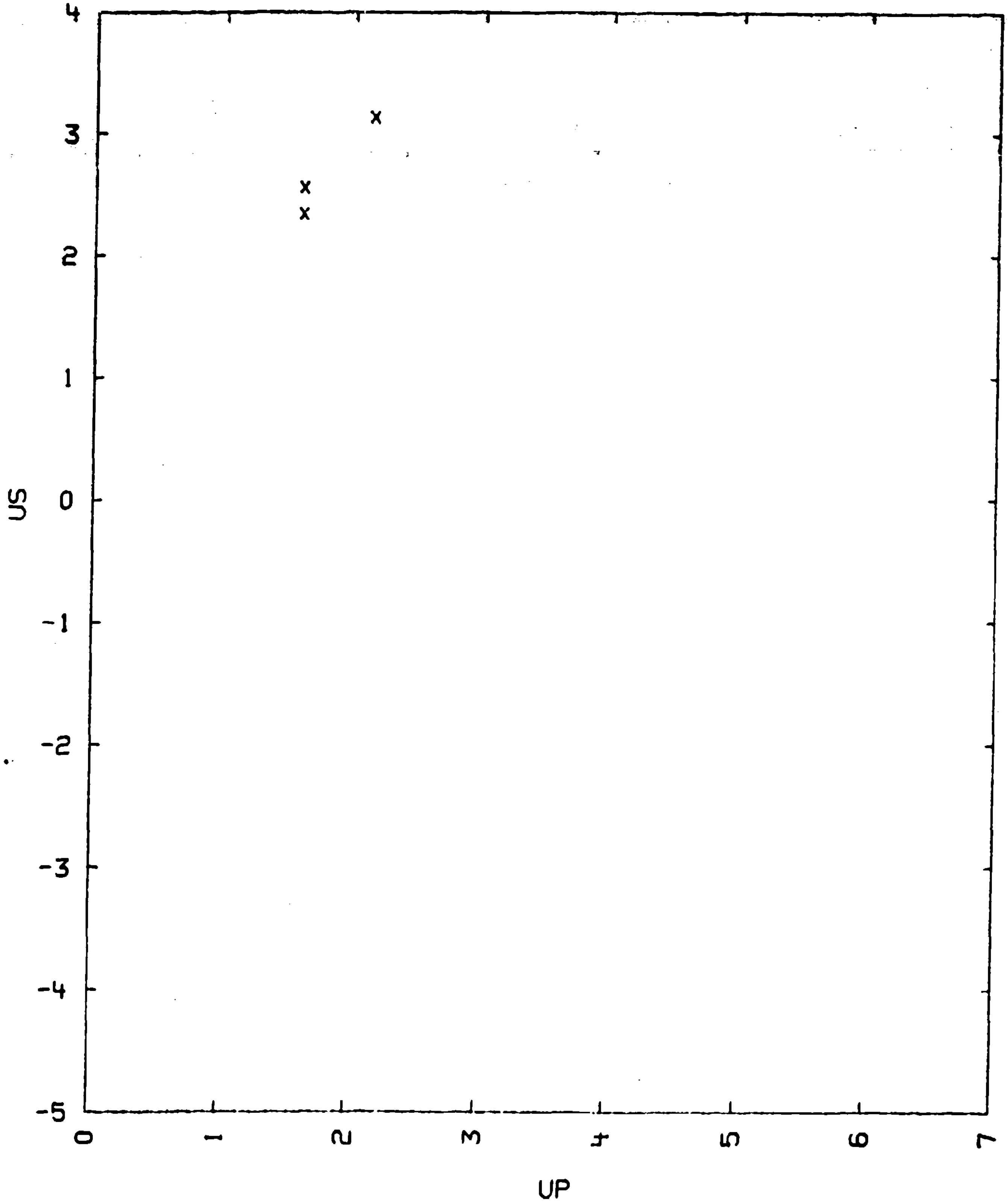


TABLE III

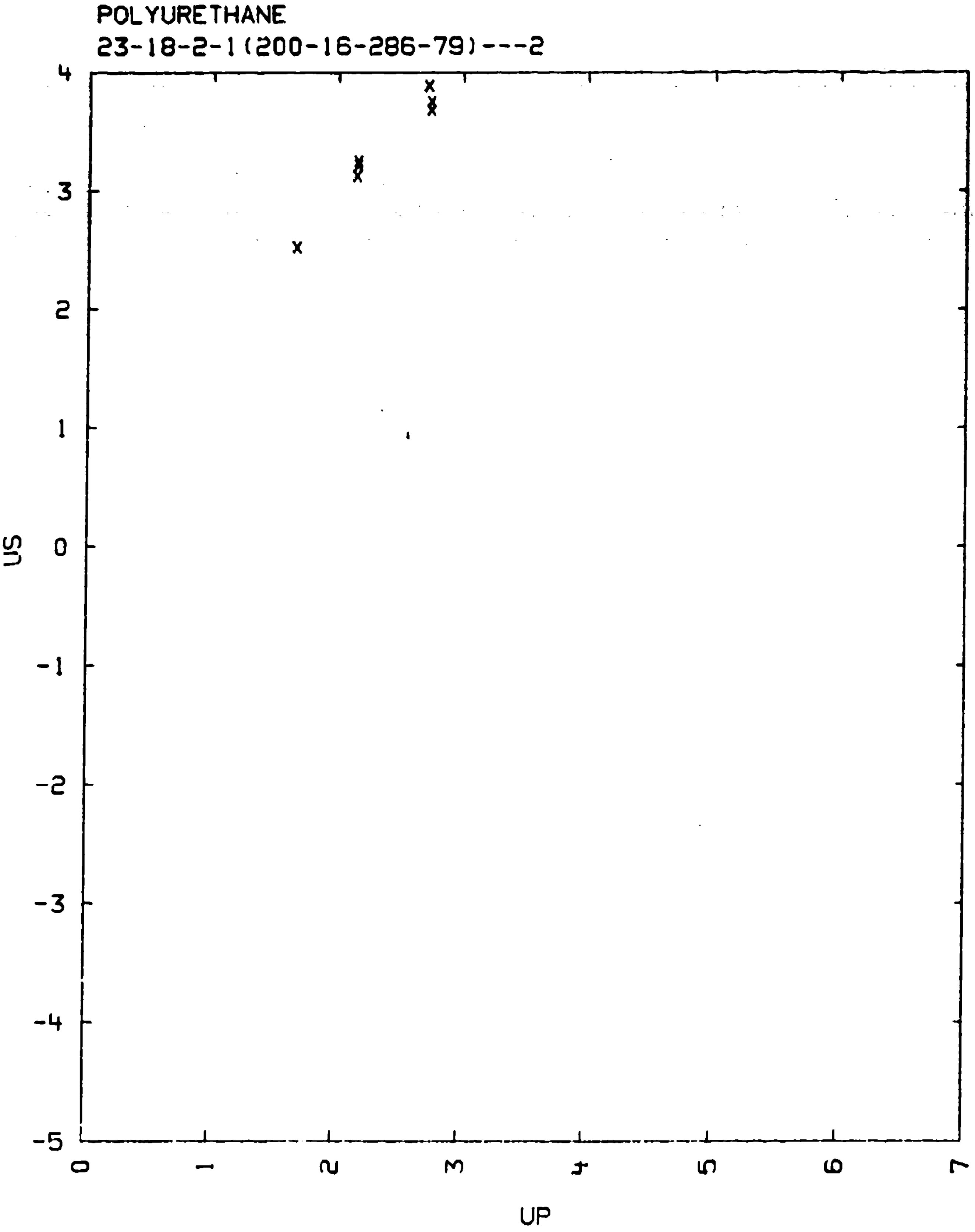

POLYURETHANE
23-18-2-1(200-16-286-79)---2
US
UP
4
3
2
1
0
-1
-2
-3
-4
-5
0
1
2
3
4
5
6
7

TABLE IV

POLYURETHANE
23-18-2-1(200-16-286-79)---2

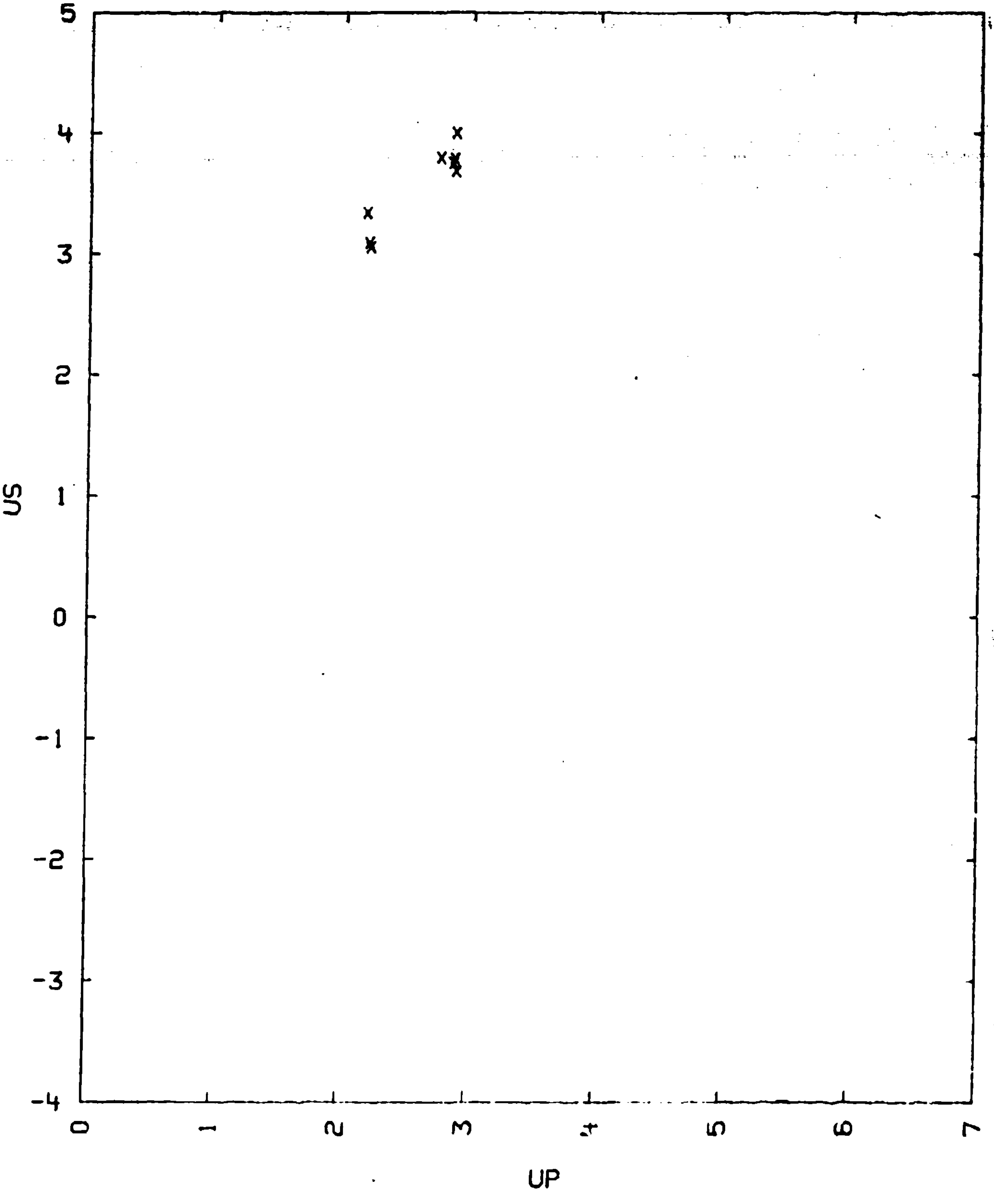


TABLE V

POLYURETHANE

23-18-2-1(200-16-286-79)---2

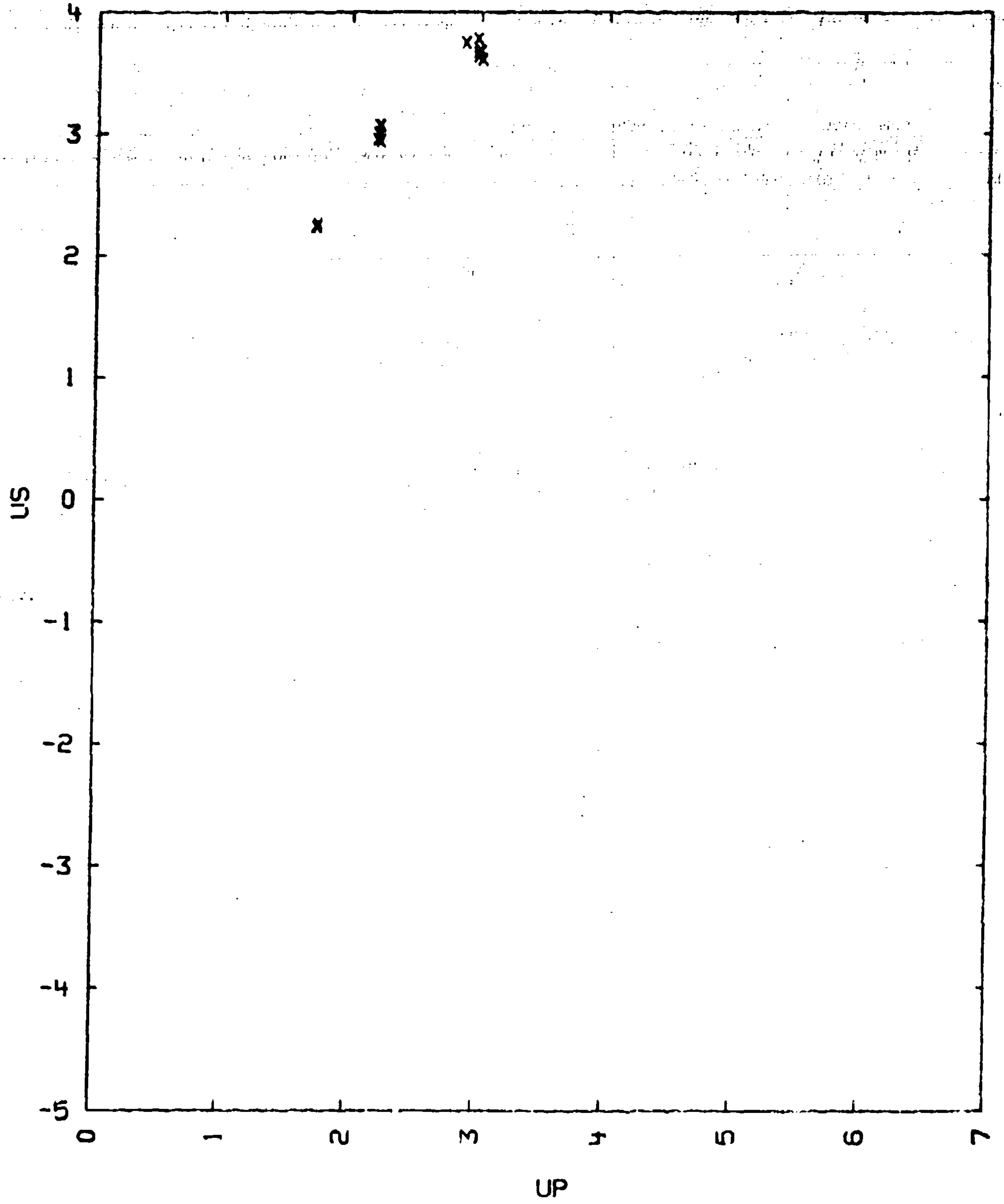
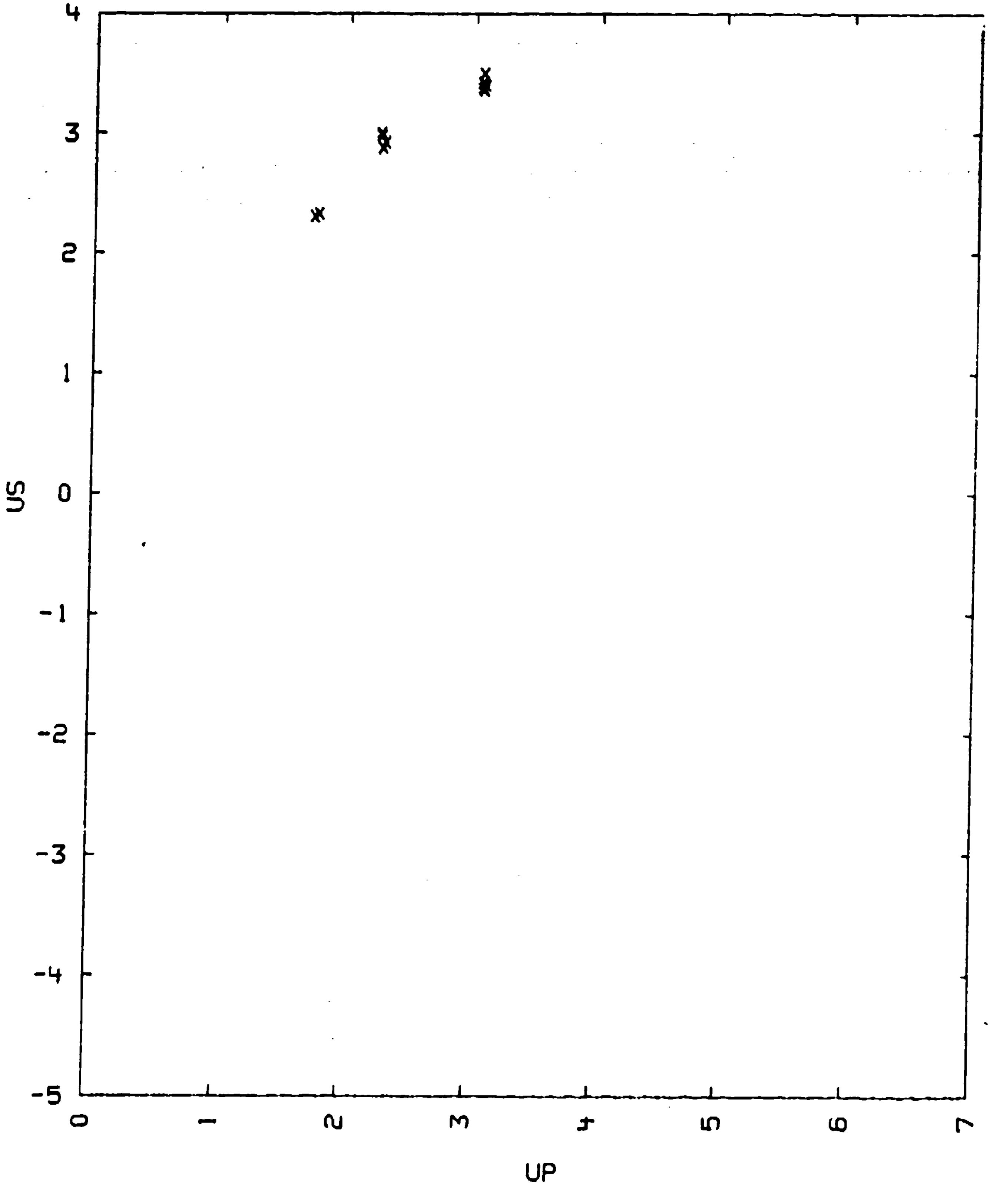


TABLE VI

POLYURETHANE
23-18-2-1(200-16-286-79)---2



23-18-10-2-1(200-8-3-349-46)---1
ADIPRENE RUBBER L-100

(C140-N6-CL2-H245-032)N

V0 = .917 - .912 CC/G

C0 = .75 - .91 KM/SEC.

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC., VELOCITIES IN KM/SEC., AND PRESSURE IN KILOBARS.

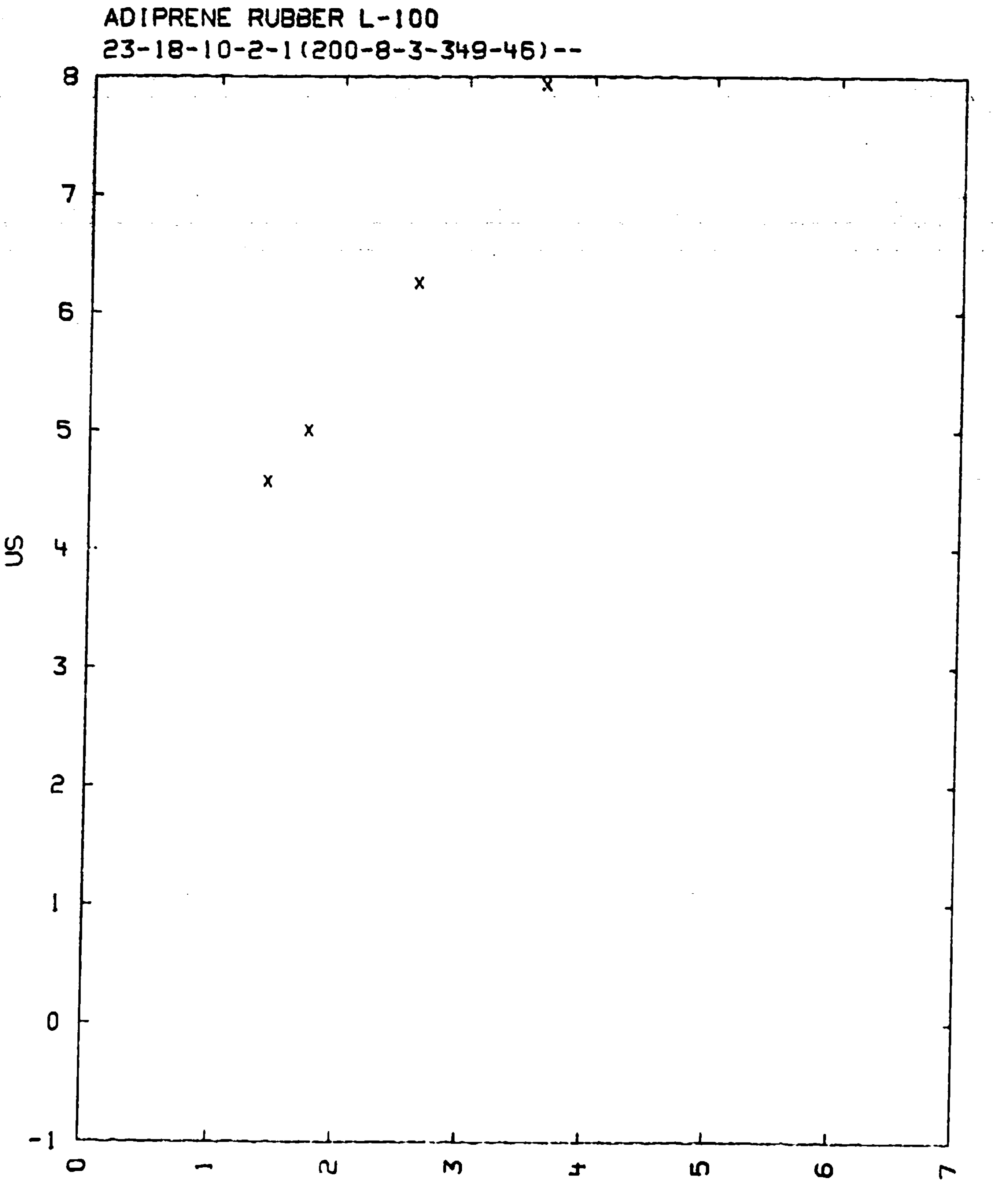
TABLE

- - - - - - SAMPLE	- - - - - - -				- - STANDARD - -	
RHO0	US	UP	P	V/V0	MATERIAL	US(ST)
1.096	4.56	1.42	71.	.6886	2024 AL	6.56
1.095	4.99	1.74	95.	.6513	2024 AL	6.86
1.091	6.24	2.61	178.	.5817	2024 AL	7.71
1.094	7.93	3.61	313.	.5448	2024 AL	8.75

US = 2.279 + 1.542*UP KM/SEC

COMMENTS:
1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B (STANDARD BASE PLATE AS SHOWN)
3) ADIPRENE L-100 IS A CONDENSATION PRODUCT OF 2,4-TOLYLENEDIISO-CYANATE AND 1,4-BUTYLENEOXIDE POLYGLOL (WITH 27-28 BUTYLENE GROUPS IN THE POLYMER). THIS LIQUID IS HARDENED WITH ABOUT 11 PERCENT BY WEIGHT OF 4,4-DIAMINO-3,3-DICHLORODIPHENYLMETHANE.

TABLE I


ADIPRENE RUBBER L-100
23-18-10-2-1(200-8-3-349-46)--
US
UP
8
7
6
5
4
3
2
1
0
-1
0
1
2
3
4
5
6
7

EDIT TEST

BOX V72 PLTR

TV80LIB DD80 OUTPUT............ 13:16:19U 06/14

172 FRAMES PLOTTED

S E C T I O N   D

MIXTURES

10-9--29---1
CHLORINETRIFLUORIDE-ALUMINUM MIXTURE

CL-F3	72.3	WT. PERCENT
AL	27.7	- -

TO = 0.0 +OR-0.7 DEG. C.
VO = 0.4850 +OR-5 CC/G.

THE TABLE LISTS DENSITY IN G/CC., VELOCITIES IN KM/SEC. AND PRESSURE IN KBAR.

TABLE

	SAMPLE				- STANDARD -	
RHOO	US	UP	P	V/VO	UP(ST)	P(ST)
2.081	3.55	1.12	82.	0.685	0.80	144.
-	4.32	1.53	136.	0.647	1.14	220.
-	5.20	2.07	222.	0.603	1.61	336.
-	6.44	2.95	392.	0.59	2.37	565.

US = 1.17 + 2.33*UP - 0.186*UP**2. KM/SEC
SIG.US = 0.014 KM/SEC.

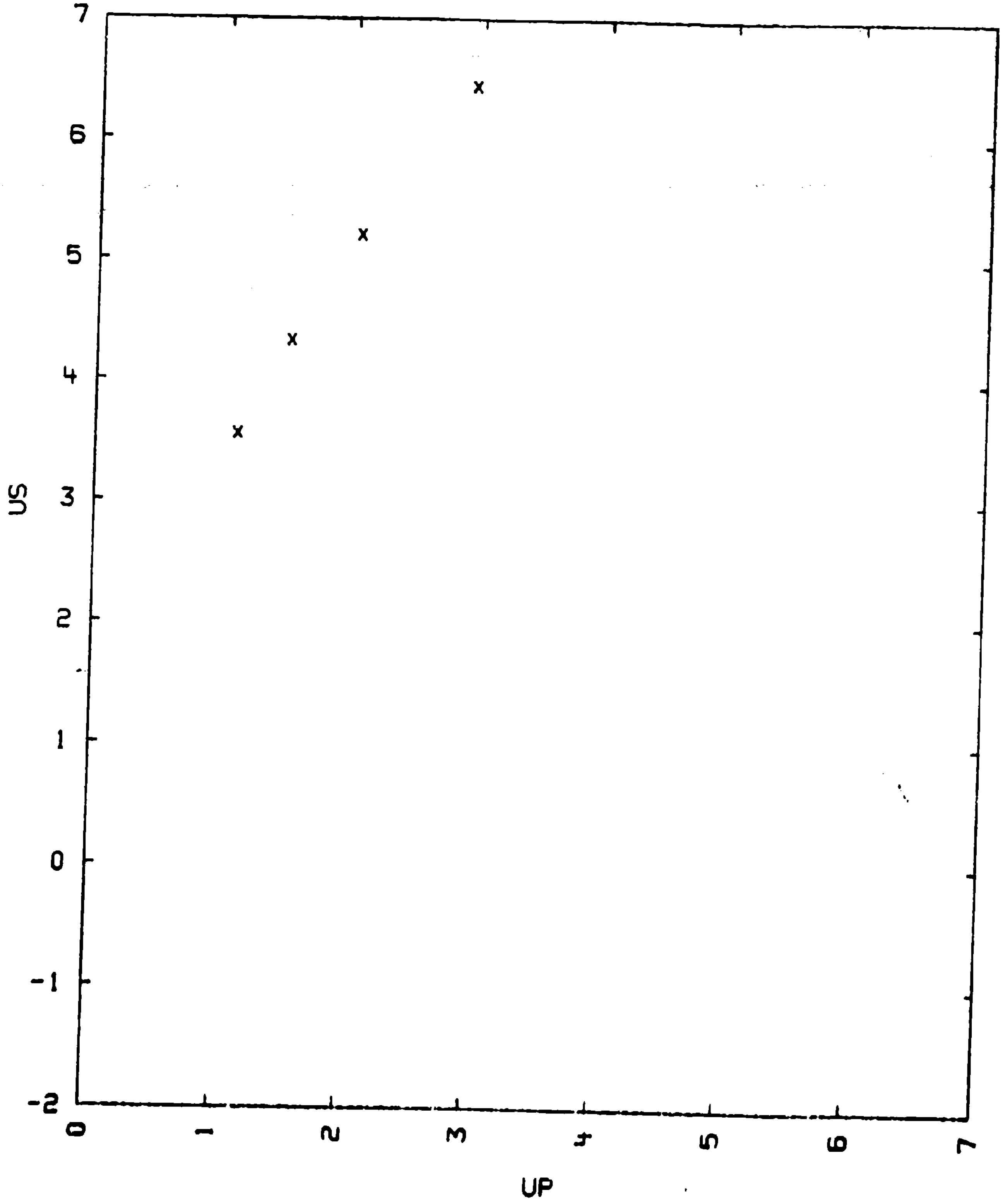
COMMENTS:

1) SOURCE: JEFFRIES, R. A. AND WACKERLE J.
LOS ALAMOS REPORT: LA-3453 (1966)
LOS ALAMOS SCIENTIFIC LAB., BOX 1663, LOS ALAMOS, N. M. 87544
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B (STANDARD MATERIAL: 2024 AL. ALLOY)
3) ERROR ESTIMATES FOR US ARE: .02 .02 .02 .13 KM/SEC.
ERROR ESTIMATES FOR UP ARE: .02 .01 .02 .06 KM/SEC.
IN THE ORDER OF THE TABLE LISTING.

TABLE I

CHLORINETRIFLUORIDE-ALUMINUM MIXTURE

10-9--29---1



18-10-2-1--29--23-18-2-1(3-3-5-9)--23-18-2-1(6-2-8-9)---1
NITROSOL PROPELLANT, CAST

NITROCELLULOSE			
(O-C5(CH2-O-H)(H)5(NO3)2-O) = (C6-N2-H8-O9)3000	10.1	WT PERCENT	
PLASTICIZER			
NITROGLYCERENE			
((H2-C(N-O3))2-C(H)-NO3)	20.1	- -	-
GLYCEROLTRIACETATE			
((H2-C(O-C-H3))-C(H)-O-C(O)-C-H3	6.4	- -	-
2-NITRODEPHENYLAMINE			
(C6(H5)-N(H)-C6(H4)-N-O3	0.3	- -	-
ALUMINUM	27.6	- -	-
AMMONIUM PERCHLORATE (NH4)(CL-O4) = N-CL-H4-O4	35.5	- -	-

VO = 0.533 CC/G

IN THE TABLE BELOW DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UP	P	V/VO
1.877	2.92	0.43	23.6	0.853
-	3.04	0.42	23.7	0.862
-	3.22	0.54	32.6	0.832
-	3.35	0.53	33.3	0.842
-	3.75	0.73	51.4	0.805
-	3.73	0.73	51.1	0.804
-	3.92	0.88	64.7	0.776
-	3.87	0.88	63.9	0.773
-	4.62	1.03	89.3	0.777
-	4.22	1.08	85.5	0.744
-	4.41	1.32	109.3	0.701
-	4.53	1.14	96.9	0.748
-	4.49	1.15	96.9	0.744
-	4.99	1.11	103.9	0.778
-	3.94	0.82	60.6	0.792
-	4.12	0.81	62.6	0.803
-	3.79	0.83	59.0	0.781
-	4.43	0.79	65.7	0.822

US = 1.87 + 2.29*UP KM/SEC
SIGMA US = 0.24 KM/SEC

COMMENTS:

1) SOURCE: BOYLE, V. M.
PRIVATE COMMUNICATION
BALLISTIC RESEARCH LABORATORIES, AMXBR-TD
ABERDEEN PROVING GROUND, MARYLAND 21005.
2) EXPERIMENTAL TECHNIQUE: THE SHOCK VELOCITY IN THE SAMPLE WAS MEASURED BY A SMEAR CAMERA THAT SWEPT THE SHADOWGRAPH OF A TRANSPARENT

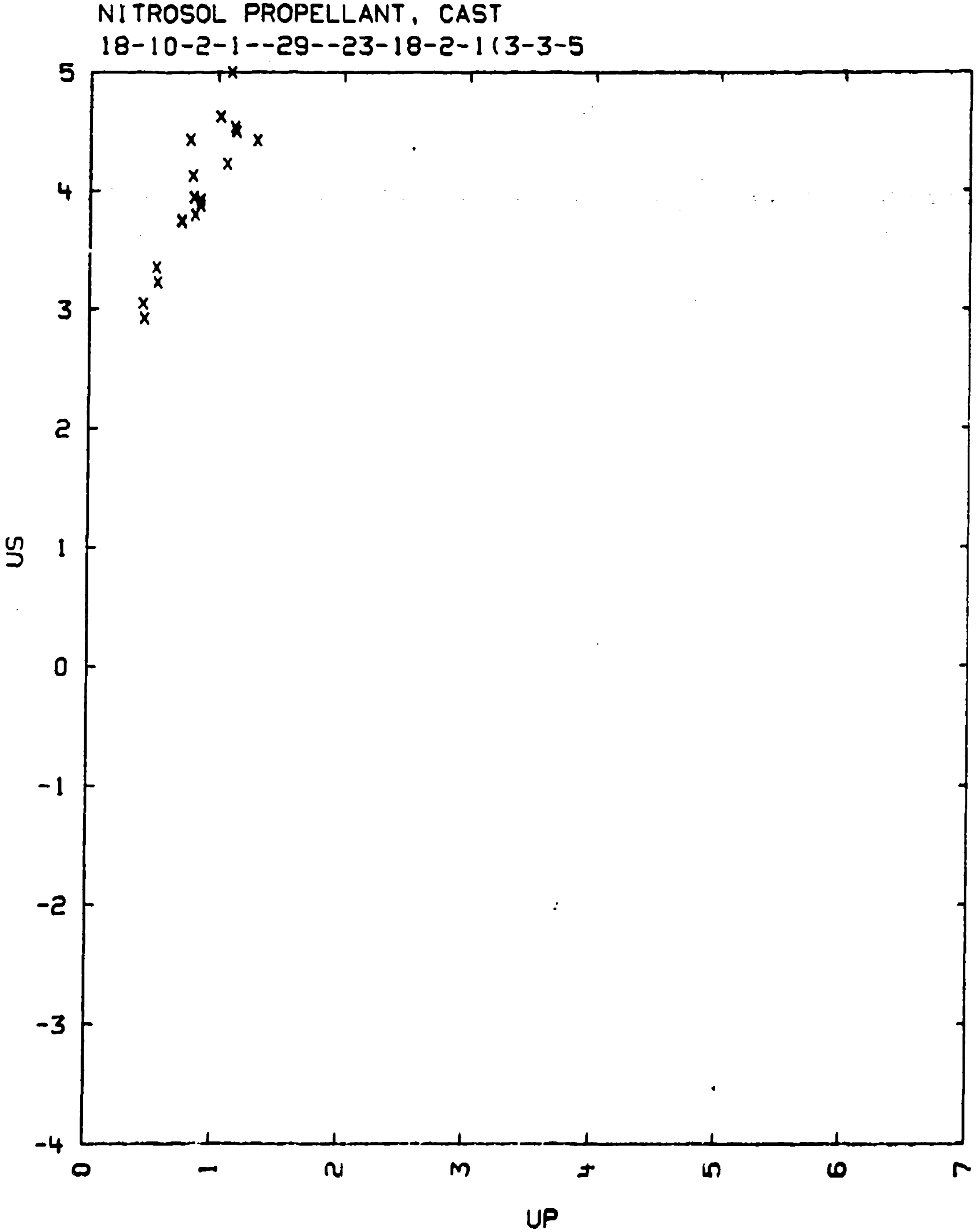
CHANNEL IN THE SAMPLE ACROSS THE FILM PLANE. THE CHANNEL WAS MADE BY SPLITTING THE SAMPLE IN TWO ALONG THE SHOCK DIRECTION AND SEPARATING THE TWO HALVES BY A THIN (0.127 MM) TRANSPARENT PLASTIC SHEET (EXTRUDED ACETATE).

DATA REDUCTION TECHNIQUE: B

STANDARD MATERIALS USED:
ALUMINUM, 2024-T4, US = 5.360 + 1.351*UP KM/SEC
RHO = 2.785 G/CC
PLEXIGLASS, US = 2.702 + 1.544*UP KM/SEC, RHO = 1.184 G/CC
UP = 1/2 UFS WAS ASSUMED FOR THE STANDARD MATERIALS SO THAT THE PRESSURE ISENTROPE COULD BE OBTAINED BY REFLECTING THE P VS. UP HOGONIOT IN THE LINE UP = 1/2 UFS.

3) THE DEGREE TO WHICH THE RESULTS MAY BE AFFECTED BY CHEMICAL REACTION OF THE SHOCKED EXPLOSIVE SAMPLE HAS NOT BEEN DETERMINED AT THIS TIME.

TABLE I



NITROSOL PROPELLANT, CAST
18-10-2-1--29--23-18-2-1(3-3-5
US
UP
5
4
3
2
1
0
-1
-2
-3
-4
0
1
2
3
4
5
6
7

23-2-1(7-6-2)--23-2-1(8-10-5)---1
MICARTA

PHENOLIC (C7-H6-O2-)N
CELLULOSE (C6-H10-O5)N
IMPURITIES NOTE 3

VO = 0.717 CC/G CL = 2.67 KM/SEC CO = 2.03 KM/SEC
CS = 1.50 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

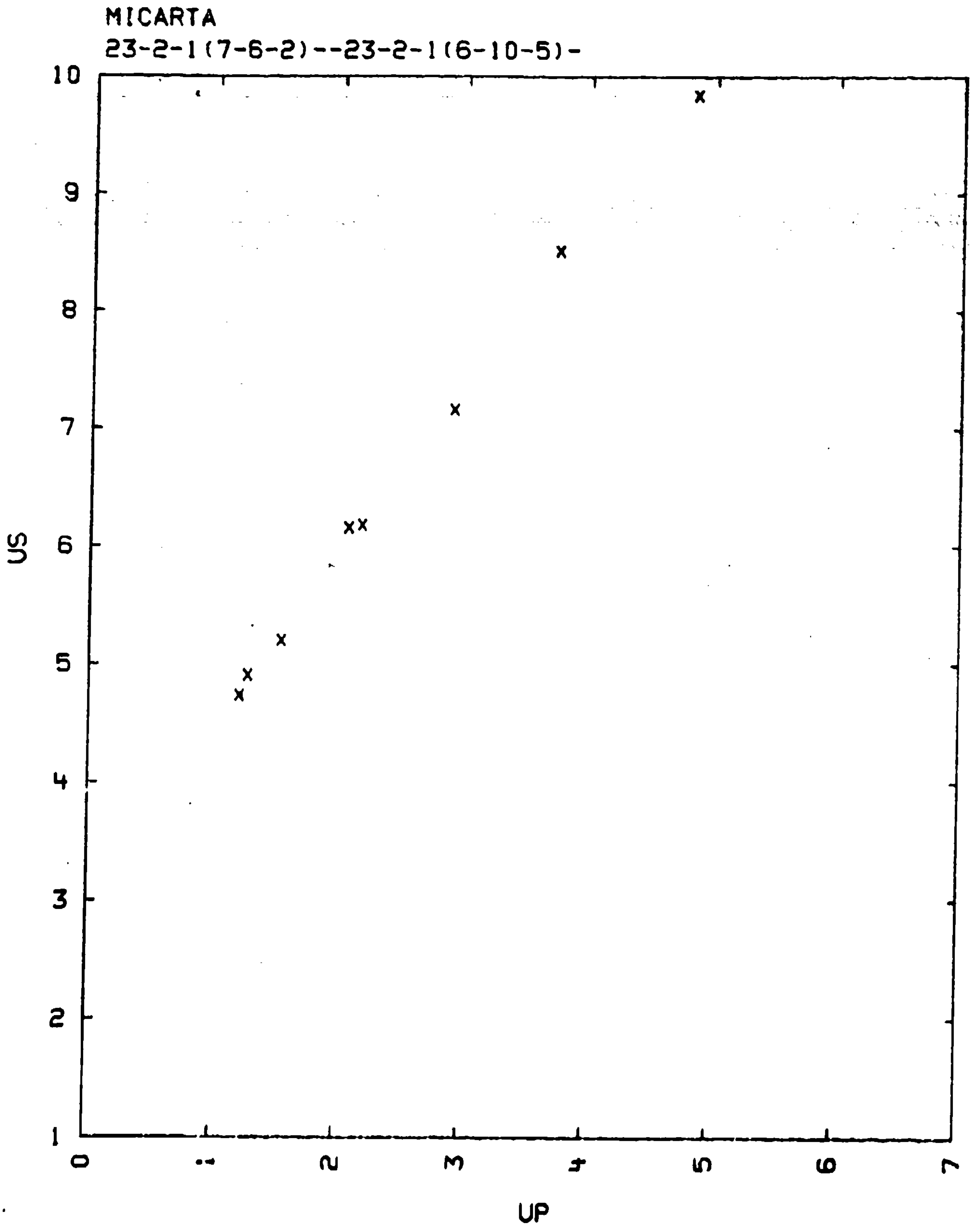
----SAMPLE----					-----STANDARD-----	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
1.394	4.73	1.22	80.	0.7421	2024 AL	6.47
1.394	4.72	1.23	81.	0.7394	2024 AL	6.47
1.394	4.90	1.28	87.	0.7388	2024 AL	6.53
1.394	5.20	1.55	112.	0.7019	2024 AL	6.80
1.394	6.15	2.08	178.	0.6618	2024 AL	7.37
1.394	6.18	2.18	188.	0.6472	2024 AL	7.46
1.394	7.15	2.92	291.	0.5916	2024 AL	8.24
1.394	8.51	3.75	445.	0.5593	2024 AL	9.16
1.394	9.84	4.85	665.	0.5071	2024 AL	10.35

US = 3.048 + 1.422*UP KM/SEC
SIGMA US = 0.096 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES. HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B
3) THE SAMPLE IS A PULP FILLED FORMALDEHYDE PHENOLIC. THE PULP IS NORMALLY ABOUT 90 PERCENT CELLULOSE. THE EXACT QUANTITY OF PULP ADDED IS NOT KNOWN.

TABLE I



23-18-2-1(1-1-3-3)--23-2-1(3-6-1)---1
NITROMETHANE-ACETONE MIXTURE

NITROMETHANE	C-H3-N-O3	75 WT	PERCENT
ACETONE	C3-H6-O	25 WT	PERCENT

V0 = 0.952 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS. (ST) DENOTES STANDARD MATERIAL.

TABLE

-SAMPLE-					-ST-
RHO0	US	UP	P	V/V0	UP
1.050	4.78	1.62	81.3	0.661	1.07
1.050	4.09	1.23	52.8	0.699	0.79
1.050	3.10	0.67	21.8	0.784	0.41

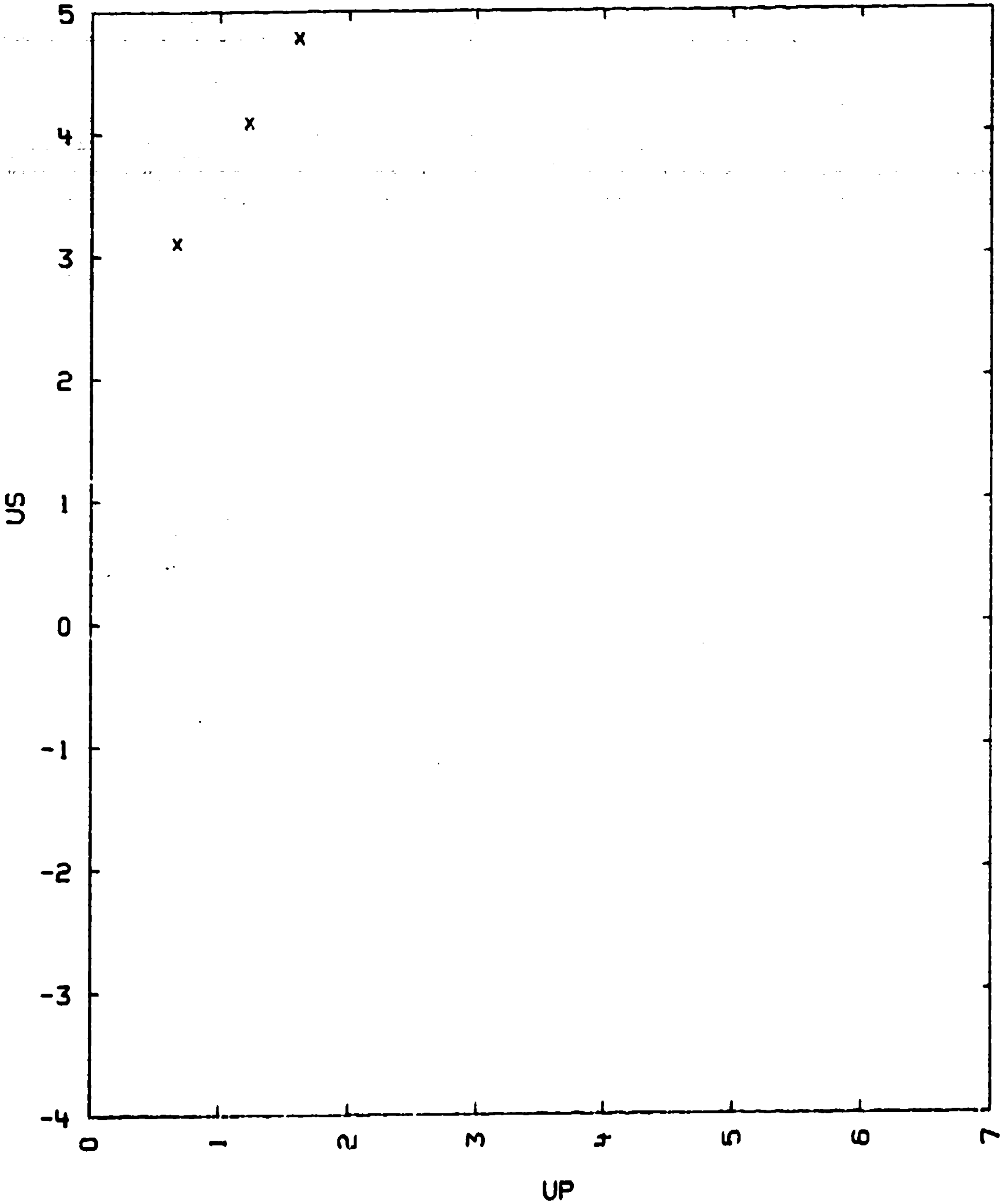
US = 1.91 + 1.77*UP KM/SEC   SIGMA US = 2.5 PERCENT

COMMENTS:

1) SOURCE: DREMIN, A. N. AND ROZANOV, O. K.
IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA, NO. 8, P. 1513 (1964) (RUSS)
ACADEMY OF SCIENCES, U.S.S.R. BULL., CHEM. SCI. P. 1417 (1964) (ENGLISH).
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL ALUMINUM: P = RHO0*(5.25+1.39*UP)*UP
3) THE AVERAGE ERROR OF THE SHOCK VELOCITY MEASUREMENTS IS +OR- 2.5 PERCENT.
4) THE MEASURED DETONATION VELOCITY ON 5.75 KM/SEC AND YIELDS A VON NEUMAN SPIKE PRESSURE OF 131 KBARS.
5) THE CHAPMAN-JOUGUET PRESSURE OF 89 KILOBARS WAS CALCULATED USING A PARTICLE VELOCITY OF 1.47 KM/SEC. THIS PARTICLE VELOCITY WAS MEASURED USING THE ELECTROMAGNETIC METHOD OF:
ZAITSEV, V. M., POKHIL, P. F. AND SHVEDOV, K. K.
DOKL. A.N. SSSR, VOL. 132, P. 1339 (1960) (RUSS)
ACADEMY OF SCIENCES, U.S.S.R. BULL. CHEM. SEC., VOL. 132, P. 529 (1360) (ENGLISH).

TABLE I

NITROMETHANE-ACETONE MIXTURE
23-18-2-1(1-1-3-3)--23-2-1(3-6



23-18-2-1(1-1-3-3)--23-2-1(3-6-1)---2
NITROMETHANE-ACETONE MIXTURE

NITROMETHANE C-H3-N-O3 84 WT PERCENT
ACETONE C3-H6-O 16 WT PERCENT

VO = 0.925 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS. (ST) DENOTES STANDARD MATERIAL.

TABLE

SAMPLE					ST
RHOO	US	UP	P	V/VO	UP
1.081	4.64	1.63	81.8	0.649	1.07
1.081	4.03	1.24	54.0	0.692	0.79
1.081	3.30	0.84	30.	0.746	0.45

US = 1.89 + 1.70*UP KM/SEC SIGMA US = 2.5 PERCENT

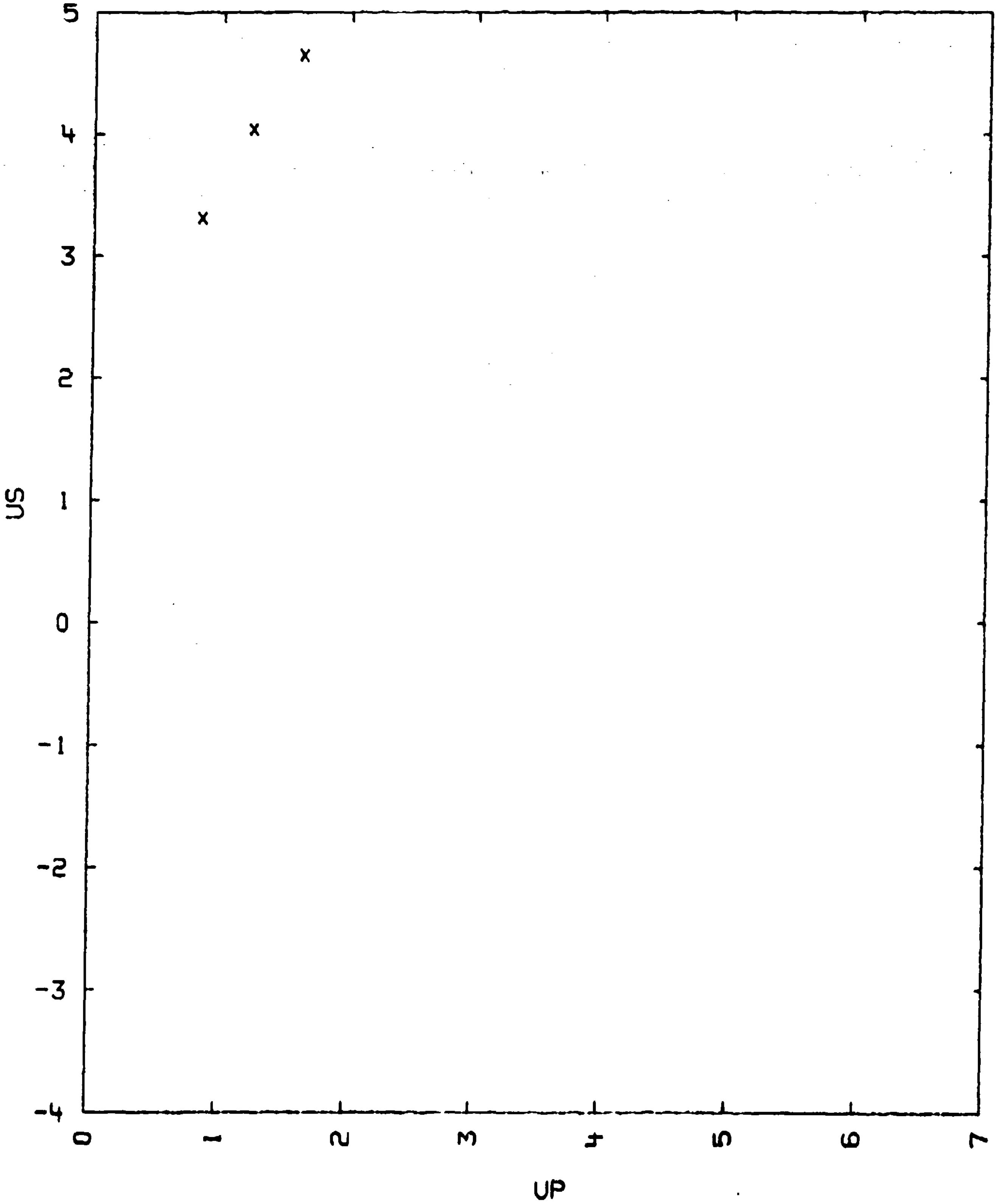
COMMENTS:

1) SOURCE: DREMIN, A. N. AND ROZANOV, O. K.
IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA, NO.8,
ACADEMY OF SCIENCES, U.S.S.R. BULL., CHEM. SCI.
P. 1417 (1964) (ENGLISH)
P. 1513 (1964) (RUSS)
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL ALUMINUM: P = RHOO*(5.25+1.39*UP)*UP.
3) THE AVERAGE ERROR OF THE SHOCK VELOCITY MEASUREMENTS IS +OR- 2.5 PERCENT.
4) THE MEASURED DETONATION VELOCITY ON 6.00 KM/SEC YIELDS A VON NEUMAN SPIKE PRESSURE OF 158 KBARS.
5) THE CHAPMAN-JOUGUET PRESSURE OF 109 KILOBARS WAS CALCULATED USING A PARTICLE VELOCITY OF 1.68 KM/SEC. THIS PARTICLE VELOCITY WAS MEASURED USING THE ELECTROMAGNETIC METHOD OF:
ZAITSEV, V. M., POKHIL, P. F. AND SHVEDOV, K. K.
DOKL. A.N. SSSR, VOL. 132, P. 1339 (1960) (RUSS)
ACADEMY OF SCIENCES, U.S.S.R. BULL. CHEM. SEC., VOL. 132,
P. 529 (1960) (ENGLISH)

TABLE I

NITROMETHANE-ACETONE MIXTURE

23-18-2-1(1-1-3-3)--23-2-1(3-6



23-18-2-1(3-6-6-6)--23-18-2-1(7-3-5-6)---1
COMP. B-3 (EXPLOSIVE)

CYCLOTRIMETHYLENETRINITRAMINE
(-(H2)C-N(N-O2)-)3 = C3-N6-H6-O6 60 WT PERCENT
TRINITROTOLUENE
(N-O2)3-C6(H2)-C-H3 = C7-N3-H5.O6 40 WT PERCENT

V0 = 0.5952 CC/G
V0I= 0.5576 CC/G
C0 = 2.736 KM/SEC

IN THE TABLE BELOW DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS. BR DENOTES THE BRASS SAMPLE HOLDER.

TABLE

---------- SAMPLE					----------	HOLDER	
RHO0	US	UP	P	V/V0	SHAPE	MATRL	UP
1.680	3.387	0.380	21.6	0.8878	DISK	BR	0.226
-	3.437	0.421	24.3	0.8775	DISK	BR	0.251
-	3.510	0.466	27.4	0.8672	DISK	BR	0.278
-	3.628	0.462	28.1	0.8726	DISK	BR	0.278
-	3.713	0.460	28.6	0.8761	DISK	BR	0.278
-	3.439	0.469	27.0	0.8636	WEDGE	BR	0.279
-	3.971	0.741	49.4	0.8133	DISK	BR	0.449
-	4.243	0.819	55.3	0.8069	DISK	BR	0.501
-	4.377	0.884	65.0	0.7980	DISK	BR	0.543
-	4.314	0.886	64.2	0.7946	DISK	BR	0.543
-	4.469	0.881	66.1	0.8028	DISK	BR	0.543
-	4.346	0.869	63.4	0.8000	DISK	BR	0.534
-	4.441	0.936	69.8	0.7892	WEDGE	BR	0.576

US = 2.71 + 1.86*UP KM/SEC
SIG US = 0.087 KM/SEC

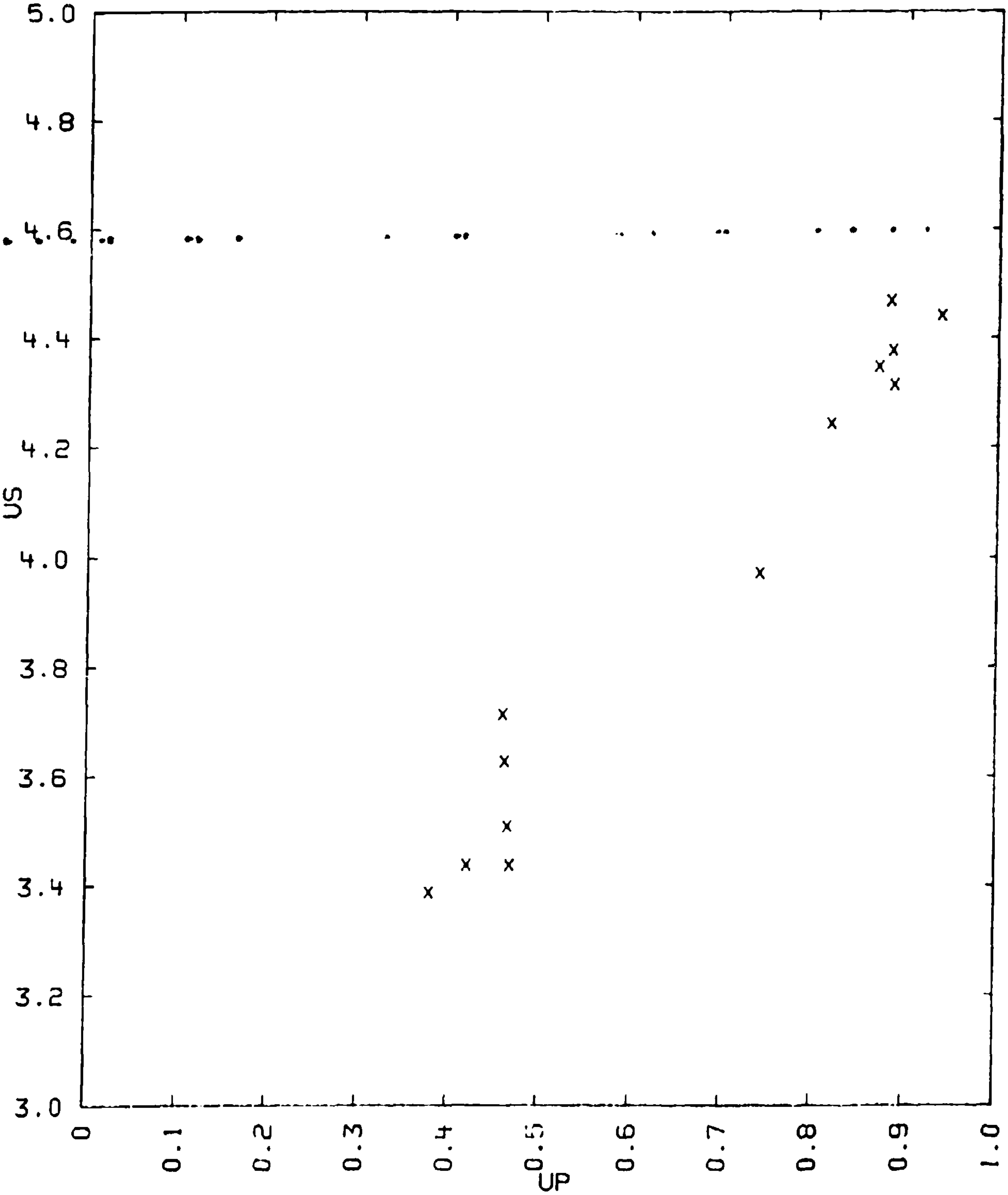
COMMENTS

1) SOURCE: COLEBURN N. L. AND LIDDIARD JR. T. P.
J. CHEM. PHYS., VOL.44, P.1929 (1965)
ALSO: PRIVATE COMMUNICATION.
2) EXPERIMENTAL TECHNIQUE C1
DATA REDUCTION METHOD B
THE HUGONIOT AND RELEASE ISENTROPES OF THE SAMPLE HOLDER WERE TAKEN TO BE MIRROR IMMAGES IN THE P VS UP PLANE.
FOR BRASS US = 3.560 + 1.833*UP KM/SEC WAS USED WITH RHO0 = 8.37 G/CC.
3) AN ALUMINIZED MYLAR FILM WAS PLACED ON THE SAMPLE WITH A THIN LAYER OF SILICONE GREASE TO INCREASE THE REFLECTIVITY.
4) THE GRUNEISEN COEFICIEN GAMMA = V(DP/DE) = 0.947.
5) THE VALUE OF V0I WAS OBTAINED BY ASSUMING VOLUME ADDITIVITY OF THE VOLUMES OF THE COMPONENTS: RDX:V0I = 0.5494 CC/G
TNT:V0I = 0.6046 CC/G

6) CO IS THE VELOCITY MEASURED ON VERY WEAK SHOCKS WITH AN UNCERTAINTY OF ABOUT 10 PERCENT.

TABLE I

COMP. B-3 (EXPLOSIVE)
23-18-2-1(3-6-6-6)--23-18-2-1(



23-18-2-1(3-6-6-6)--23-18-2-1(7-3-5-6)---2
COMPOSITION B, CAST (EXPLOSIVE)

CYCLOTRIMETHYLENETRINITRAMINE		
	(-(H2)C-N(N-O2)-)3 = C3-N6-H6-O6	60 WT PERCENT
TRINITROTOLUENE		
	-(C-H3)C-C(N-O2)(-C(H)-C(N-O2)-)2 = C7-N3-H5-O6	40 WT PERCENT
WAX		
	(C46-H92-O2) UNCERTAIN	1 WT PERCENT

VO = 0.588 CC/G
VOI = 0.5576 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UP	P	V/VO
1.700	4.22	0.81	58.1	0.808
-	3.60	0.54	33.0	0.850
-	3.43	0.55	32.1	0.839
-	4.98	1.31	110.9	0.737
-	4.99	1.31	111.1	0.737
-	3.71	0.53	33.4	0.857
-	4.14	0.82	57.7	0.802
-	4.35	1.04	76.9	0.761
-	3.49	0.50	29.7	0.857
-	4.09	0.82	57.0	0.799
-	5.25	1.27	113.3	0.758
-	3.89	0.84	55.5	0.784
-	5.22	1.25	110.9	0.761
-	4.67	1.17	92.9	0.749
-	4.78	1.16	94.3	0.757
-	4.77	1.16	94.1	0.757
-	4.88	1.15	95.4	0.764
-	4.26	0.82	59.4	0.808
-	4.07	0.83	57.4	0.796
-	4.23	0.82	58.9	0.806
-	4.07	0.83	57.4	0.796

US = 2.49 + 1.99*UP KM/SEC
SIGMA US = 0.14 KM/SEC

COMMENTS:

1) SOURCE: BOYLE, V. M. AND ERVIN, L. H.
BRL MEMO. REPORT NO. 1814, JANUARY 1967
BALLISTIC RESEARCH LABORATORIES, AMXBR-TD
ABERDEEN PROVING GROUND, MARYLAND 21005.
2) EXPERIMENTAL TECHNIQUE: THE HOCK VELOCITY IN THE SAMPLE WAS MEASURED

BY A SMEAR CAMERA THAT SWEPT THE SHADOWGRAPH OF A TRANSPARENT CHANNEL IN THE SAMPLE ACROSS THE FILM PLANE. THE CHANNEL WAS MADE BY SPLITTING THE SAMPLE IN TWO ALONG THE SHOCK DIRECTION AND SEPARATING THE TWO HALVES BY A THIN (0.127 MM) TRANSPARENT PLASTIC SHEET (EXTRUDED ACETATE).

DATA REDUCTION TECHNIQUE: B

STANDARD MATERIALS USED:
ALUMINUM, 2024-T4, US = 5.360 + 1.351*UP KM/SEC
RHO = 2.785 G/CC
PLEXIGLASS,US = 2.702 + 1.544*UP, KM/SEC, RHO = 1.184 G/CC
UP = 1/2 UFS WAS ASSUMED FOR THE STANDARD MATERIALS SO THAT THE PRESSURE ISENTROPE COULD BE OBTAINED BY REFLECTING THE P VS. UP HUGONIOT IN THE LINE UP = 1/2 UFS.

3) THE DEGREE TO WHICH THE RESULTS MAY BE AFFECTED BY CHEMICAL REACTION OF THE SHOCKED EXPLOSIVE SAMPLE HAS NOT BEEN DETERMINED AT THIS TIME.

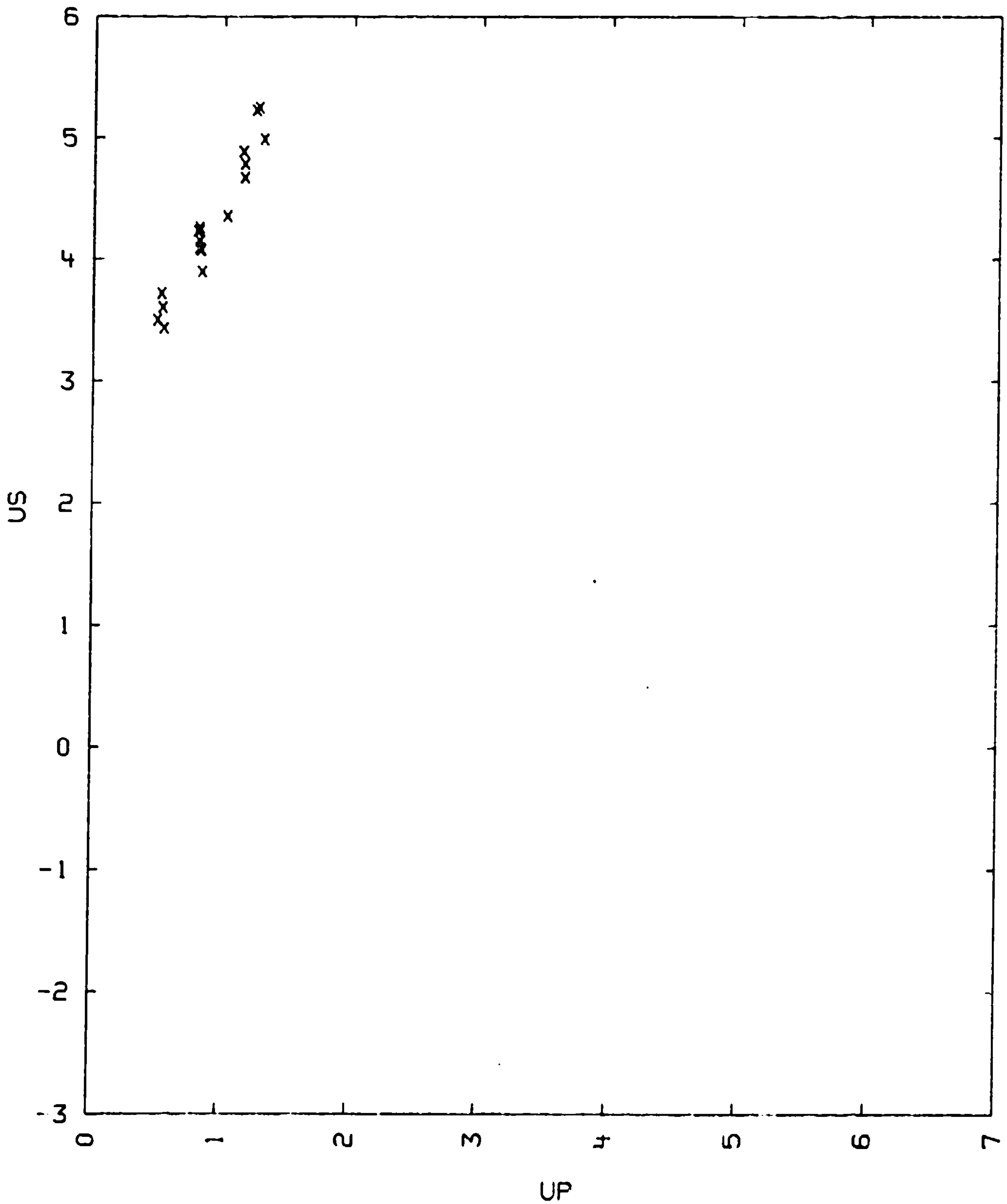
4) THE VALUE OF VOI WAS OBTAINED BY ASSUMING VOLUME ADDITIVITY OF THE VOLUMES OF THE COMPONENTS: RDX VOI = 0.5494 CC/G AND FOR TNT VOI = 0.6046 CC/G.

5) THESE DATA ARE FELT TO BE MORE ACCURATE THAN PREVIOUSLY REPORTED DATA REPRESENTED BY US = 2.88 + 1.60*UP KM/SEC BY BOYLE, V.M., JAMESON, R.L., AND ALLISON, F.E. BRL REPORT NO. 1250, (1964). THE PRESENT DATA REPLACE THE OLDER DATA..

TABLE I

COMPOSITION B, CAST (EXPLOSIVE)

23-18-2-1(3-6-6-6)--23-18-2-1(



23-18-2-1(3-6-6-6)--23-18-2-1(7-3-5-6)---3
COMP. B-3 (EXPLOSIVE)

RDX (CYCLOTRIMETHYLENETRINITRAMINE)
(-(H2)C-N(N-O2)-)3 = C3-N6-H6-O6 59.5 WT PERCENT
TNT (TRINITROTOLUENE)
(N-O2)3-C6(H2)-C-H3 = C7-N3-H5.O6 40.5 WT PERCENT

V0 = 0.580 CC/G
V0I = 0.558 CC/G

IN THE TABLE BELOW DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS. X DENOTES BRASS PLATE THICKNESS IN CM.

TABLE

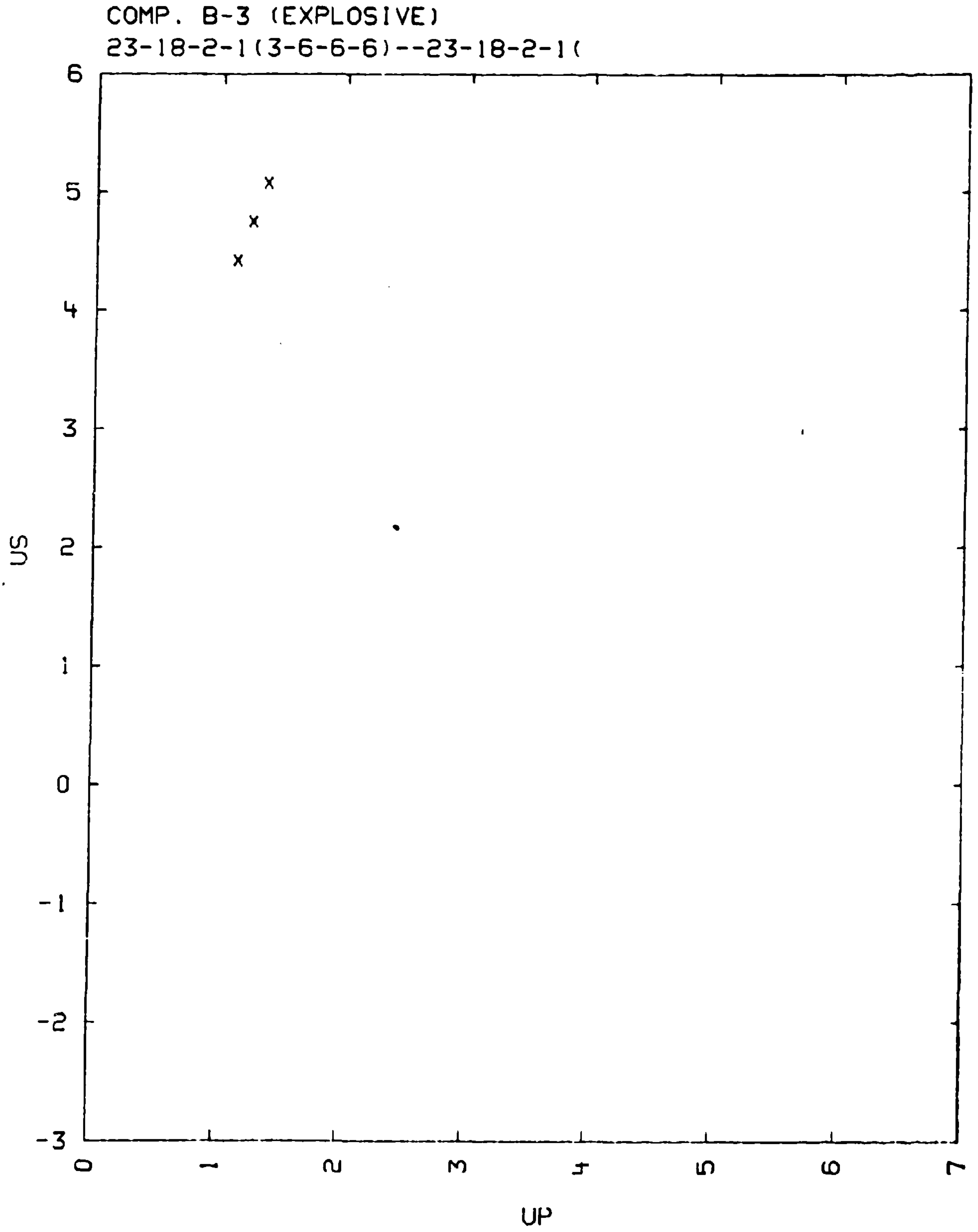
RHO0	X	US	UP	P	
1.723	1.283	5.07	1.366	119.3	0.7306
-	2.520	4.75	1.251	102.3	0.7367
-	3.759	4.42	1.135	86.4	0.7433

US = 1.23 + 2.81*UP +OR- 0.05 KM/SEC

COMMENTS:

1) SOURCE: MAJOWICZ, M. J. AND JACOBS, S. J.
NAVORD REPORT NO. 5710, 1958
U.S. NAVAL ORDNANCE LAB., WHITE OAK, MARYLAND, U.S.A.
2) EXPERIMENTAL TECHNIQUE C
DATA REDUCTION TECHNIQUE B. WHERE UP = 1/2(UFS). IT WAS ASSUMED THE RELEASE ISENTROPE WAS A STRAIGHT LINE WITH SLOPE RHO0(US).
STANDARD MATERIAL BRASS.
3) US IS THE VELOCITY AT ZERO THICKNESS OF THE EXPLOSIVE OBTAINED BY EXTRAPOLATING THE VELOCITY VERSUS THICKNESS CURVE OBTAINED FROM A WEDGE OF EXPLOSIVE.
4) THE DETONATION VELOCITY IS 7.99 KM/SEC, SIGMA = 0.005 KM/SEC.
THIS VELOCITY WAS REACHED AT THICKNESS BETWEEN 1.7-2.7 MM DEPENDING ON INPUT PRESSURE.
5) THE VALUE OF V0I WAS OBTAINED BY ASSUMING VOLUME ADDITIVITY OF THE VOLUME OF THE COMPONENTS: RDX:V0I= 0.5494, TNT:V0I = 0.6046 CC/G.
6) THE UNCERTIANTY OF THE FIT IS ESTIMATED FROM ALL DATA GIVEN BY THE ABOVE REFERENCE.

TABLE I


COMP. B-3 (EXPLOSIVE)
23-18-2-1(3-6-6-6)--23-18-2-1(
US
UP
6
5
4
3
2
1
0
-1
-2
-3
0
1
2
3
4
5
6
7

23-18-2-1(3-6-6-6)--23-18-2-1(7-3-5-6)---4
CYCLOTOL (EXPLOSIVE)

RDX (EXPLOSIVE) 75 WT PERCENT
(-C(H2)-N(N-O2)-)3 = C3-N6-H6-O6
TNT (TRINITROTOLUENE)
(N-O2)3-C6(H2)-C-H3 = C7-N3-H5-O6 25 WT PERCENT

V0 = 0.5783 CC/G
V0I = 0.5650 CC/G

IN THE TABLE BELOW DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS. X DENOTES BRASS STANDARD THICKNESS IN CM.

TABLE

RHO0	X	US	UP	P	V/V0
1.729	1.285	5.22	1.357	122.5	0.744
-	2.499	4.95	1.242	106.3	0.740
-	3.762	4.67	1.124	90.8	0.759

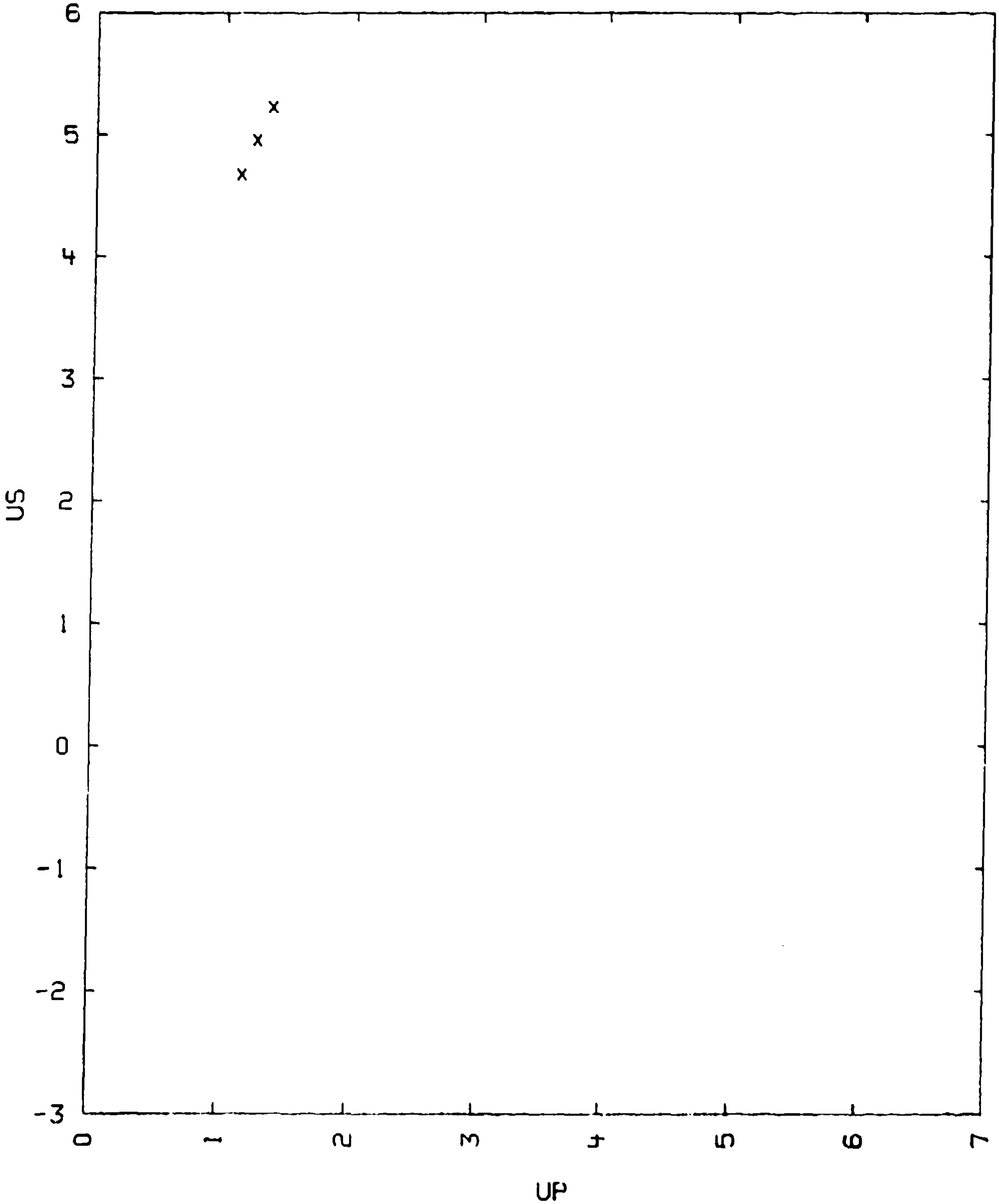
US = 2.02 + 2.36*UP +OR- 0.05 KM/SEC

COMMENTS:

1) SOURCE: MAJOWICZ, M. J. AND JACOBS, S. J.
NAVORD REPORT NO. 5710, 1958
U.S. NAVAL ORDNANCE LAB., WHITE OAK, MARYLAND, U.S.A.
2) EXPERIMENTAL TECHNIQUE C
DATA REDUCTION TECHNIQUE B. WHERE UP = 1/2(UFS), IT WAS ASSUMED THE RELEASE ISENTROPE WAS A STRAIGHT LINE WITH SLOPE RHO0(US).
STANDARD MATERIAL BRASS.
3) US IS THE VELOCITY AT ZERO THICKNESS OF THE EXPLOSIVE OBTAINED BY EXTRAPOLATING THE VELOCITY VERSUS THICKNESS CURVE OBTAINED FROM A WEDGE OF EXPLOSIVE.
4) THE DETONATION VELOCITY IS 8.22 KM/SEC, SIGMA = 0.001 KM/SEC.
THIS VELOCITY WAS REACHED AT THICKNESS BETWEEN 3.6-6.1 MM DEPENDING ON INPUT PRESSURE.
5) THE VALUE OF V0I WAS OBTAINED BY ASSUMING VOLUME ADDITIVITY OF THE VOLUMES OF THE COMPONENTS: RDX:V0I = 0.5494, TNT:V0I = 0.6046 CC/G.
6) THE UNCERTAINTY OF THE FIT IS ESTIMATED FROM ALL DATA GIVEN BY THE ABOVE REFERENCE.

TABLE I

CYCLOTOL (EXPLOSIVE)
23-18-2-1(3-6-6-6)--23-18-2-1(



23-18-2-1(3-6-6-6)--23-18-2-1(7-3-5-6)---5
COMP. B (EXPLOSIVE)

RDX (CYCLOTRIMETHYLENETRINITRAMENE)
(-C(H2)-N(N-O2)-)3 = C3-N6-H6-O6 63.0 WT PERCENT
TNT (TRINITROTOLUENE)
(N-O2)3-C6(H2)-C-H3 = C7-N3H5.O6 36.0 WT PERCENT
WAX (C-H2)N 1.0 WT PERCENT

V0 = 0.5847 CC/G
V0 = 0.4578 CC/G

IN THE TABLE BELOW DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS. X DENOTES BRASS STANDARD THICKNESS IN CM.

TABLE

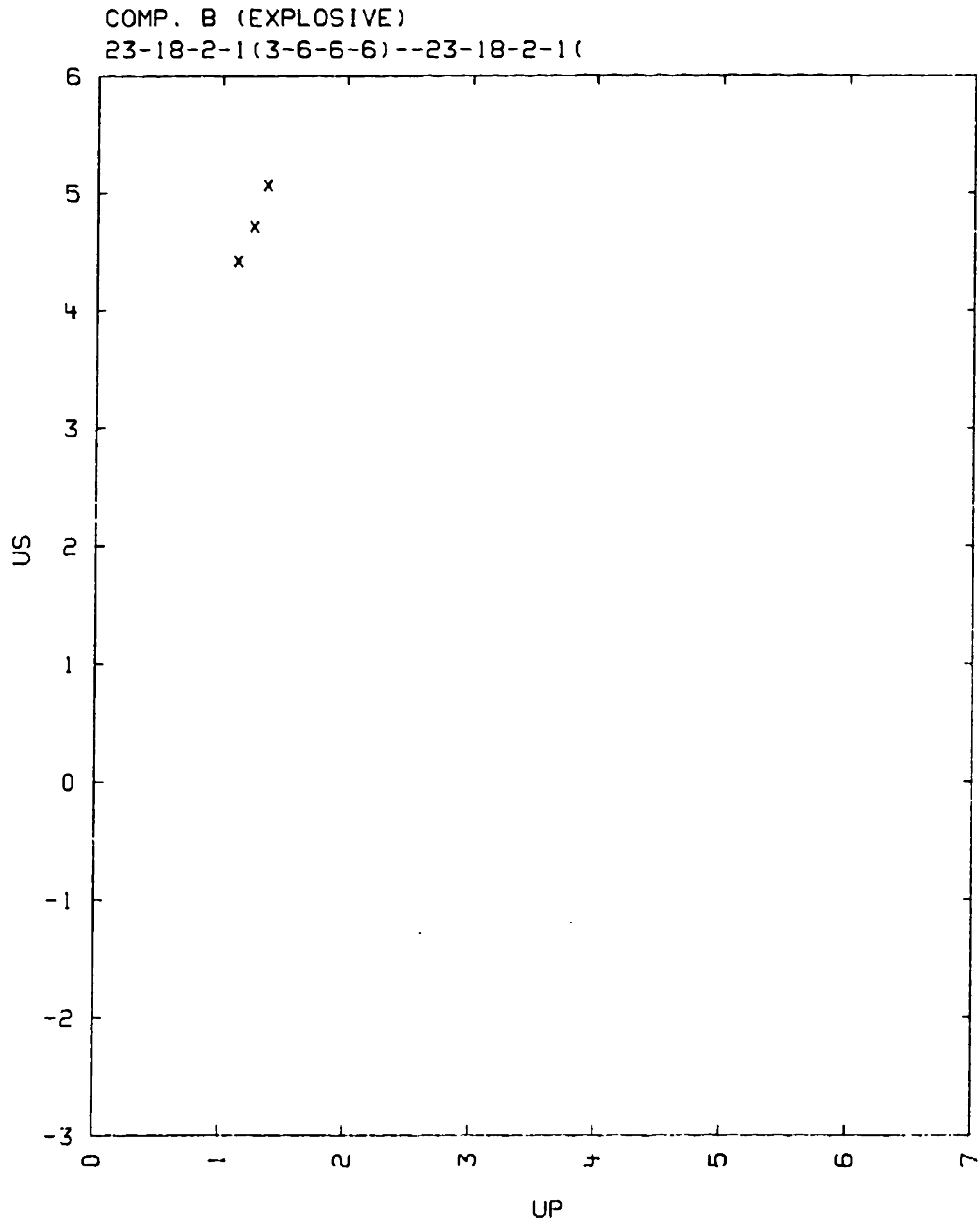
RHO0	X	US	UP	P	V/V0
1.710	1.282	5.06	1.368	118.4	0.7296
-	2.434	4.71	1.257	101.3	0.7331
-	3.759	4.41	1.137	85.6	0.7422

US = 1.20 + 2.81*UP +OR- 0.04 KM/SEC

COMMENTS:

1) SOURCE: MAJOWICZ, M. J. AND JACOBS, S. J.
NAVORD REPORT NO. 5700, 1958
U.S. NAVAL ORDNANCE LAB., WHITE OAK, MARYLAND, U.S.A.
2) EXPERIMENTAL TECHNIQUE C
DATA REDUCTION TECHNIQUE B. WHERE UP = 1/2(UFS). IT WAS ASSUMED THE RELEASE ISENTROPE WAS A STRAIGHT LINE WITH SLOPE RHO0(US).
STANDARD MATERIAL BRASS.
3) US IS THE VELOCITY AT ZERO THICKNESS OF THE EXPLOSIVE OBTAINED BY EXTRAPOLATING THE VELOCITY VERSUS THICKNESS CURVE OBTAINED FROM A WEDGE OF EXPLOSIVE.
4) THE DETONATION VELOCITY IS 7.93 KM/SEC, SIGMA = 0.015 KM/SEC.
THIS VELOCITY WAS REACHED AT THICKNESS BETWEEN 2.8-6 MM DEPENDING ON INPUT PRESSURE.
5) THE VALUE OF V01 WAS OBTAINED BY ASSUMING VOLUME ADDITIVITY OF THE VOLUME OF THE COMPONENTS: RDX:V01 = 0.5494, TNT:V01 = 0.6046 CC/G.

TABLE I


COMP. B (EXPLOSIVE)
23-18-2-1(3-6-6-6)--23-18-2-1(
US
UP
6
5
4
3
2
1
0
-1
-2
-3
0
1
2
3
4
5
6
7

23-18-2-1(3-6-6-6)--23-18-2-1(7-3-5-6)--29---1
RDX/TNT/ALUMINUM/WAX (HBX-1) (EXPLOSIVE)

RDX	(-C(H2)-N(N-O2)-)3	= C3-N6-H6-O6	40 WT PERCENT
TNT	-C(C-H3)-C(N-O2)(C(H)-C(N-O2)-)2	= C7-N3-H5-O6	38 - -
ALUMINUM	AL		17 - -
WAX	(C-H2)N UNCERTAIN		5 - -

V0 = 0.5714 CC/G   C0 = 2.860 KM/SEC
V0I= 0.563 CC/G

THE TABLE LISTS DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS

TABLE

RHO0	US	UP	P	V/V0
1.750	2.860	0.000	0.0	1.00
-	3.810	0.580	38.6	0.847
-	4.347	0.835	63.5	0.807
-	4.707	0.977	80.4	0.792
-	4.767	1.000	83.4	0.790
-	4.550	1.020	81.2	0.775
-	4.368	0.855	65.3	0.804

US = A + B*UP   A = 2.936 KM/SEC,   SIGA = 0.078 KM/SEC
SIG US = 0.10 KM/SEC   B = 1.651   SIGB = 0.095

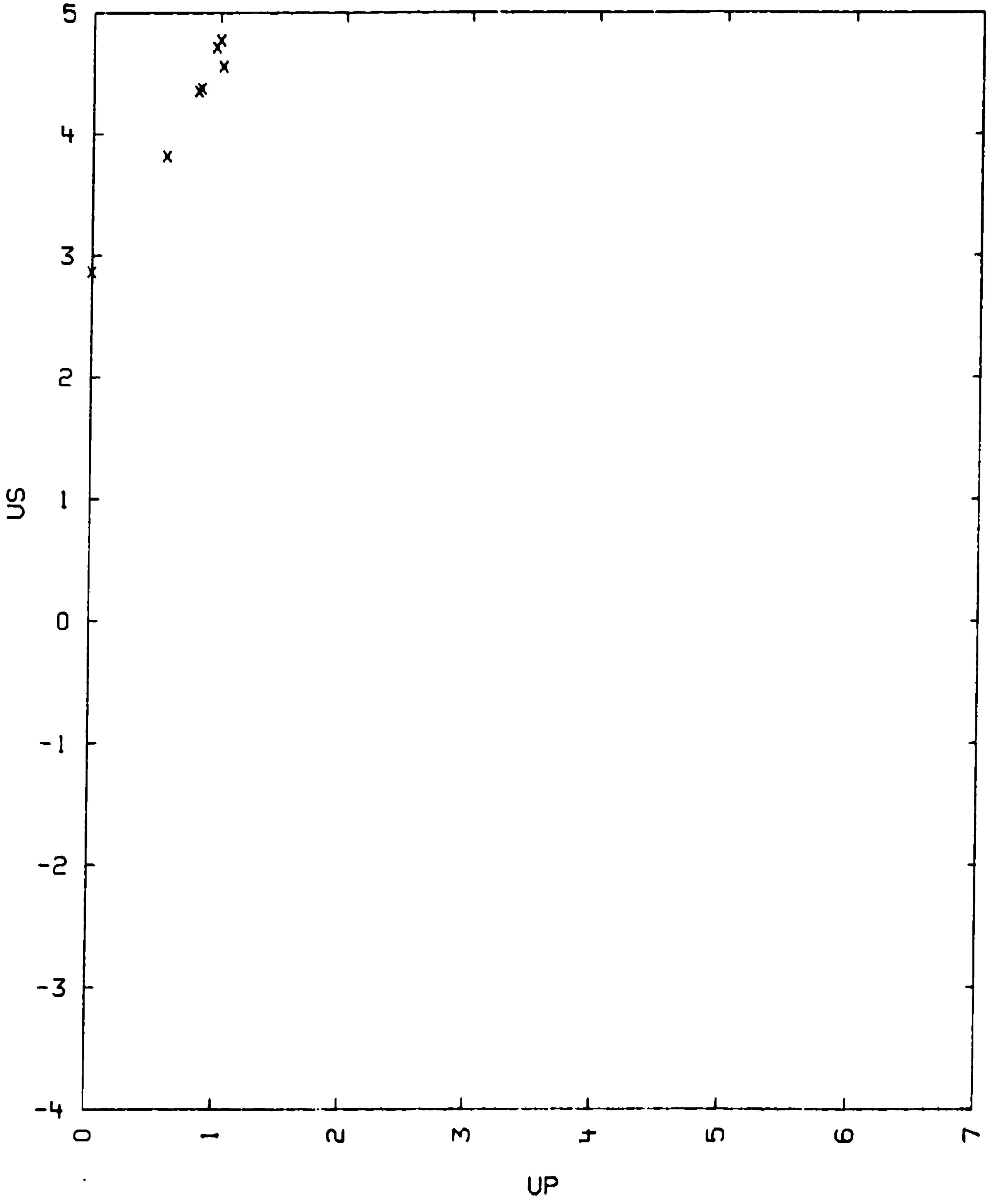
COMMENTS:

1) SOURCE: COLEBURN N. L. AND LIDDIARD JR. T. P.
J. CHEM. PHYS., VOL. 44, P. 1929 (1965)
ALSO: PRIVATE COMMUNICATION
2) EXPERIMENTAL TECHNIQUE C1
DATA REDUCTION METHOD B: UP=1/2*UP WAS ASSUMED FOR THE STANDARD MATERIALS BRASS AND PLEXIGLAS, SO THAT THE PRESSURE RELEASE ISENTROPE COULD BE OBTAINED BY REFLECTING THE P VS UP HUGONIOT IN THE LINE UP = 1/2*UFS
3) FOR BRASS US = 3.560 + 1.833*UP KM/SEC.
FOR PLEXIGLAS US = 2.710 + 1.568*UP - 0.037*UP**2
4) THE GRUNEISEN COEFICIENT GAMMA = V(DP/DE) = 2.43
5) THE VALUE OF V0I WAS OBTAINED BY ASSUMING VOLUME ADDITIVITY OF THE VOLUMES OF THE COMPONENTS: RDX:V0I = 0.5494 CC/G
TNT:V0I = 0.6046 CC/G
AL :V0I = 0.3704 CC/G
WAX:V0I = 1.01 CC/G
6) C0 IS THE VELOCITY MEASURED ON VERY WEAK SHOCKS WITH AN UNCERTAINTY OF ABOUT 10 PERCENT

TABLE I

RDX/TNT/ALUMINUM/WAX (HBX-1) (EXPLOSIVE)

23-18-2-1(3-6-6-6)--23-18-2-1(



23-18-2-1(3-6-6-6)--23-18-2-1(7-3-5-6)--29---2
RDX/TNT/ALUMINUM/WAX (HBX-3) (EXPLOSIVE)

RDX	(-C(H2)-N(N-O2)-)3	31	WT PERCENT
TNT	-C(C-H3)-C(N-O2)-(C(H)-C(N-O2)-)2	29	- -
ALUMINUM	AL	35	- -
WAX	(C-H2)N UNCERTAIN	5	- -

V0 = 0.5405 CC/G C0 = 3.095 KM/SEC
V01= 0.526 CC/G

THE TABLE LISTS DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS

TABLE

RHO0	US	UP	P	V/V0
1.850	3.990	0.560	41.3	0.859
-	4.668	0.990	85.4	0.787
-	4.745	0.967	84.8	0.796
-	3.728	0.320	22.0	0.914
-	4.550	0.840	70.7	0.815
-	3.095	0.000	0.0	1.000

US = A + B*UP A = 3.134 KM/SEC, SIGA = 0.017 KM/SEC.
SIG US = 0.070 KM/SEC B = 1.605 SIGB = 0.024

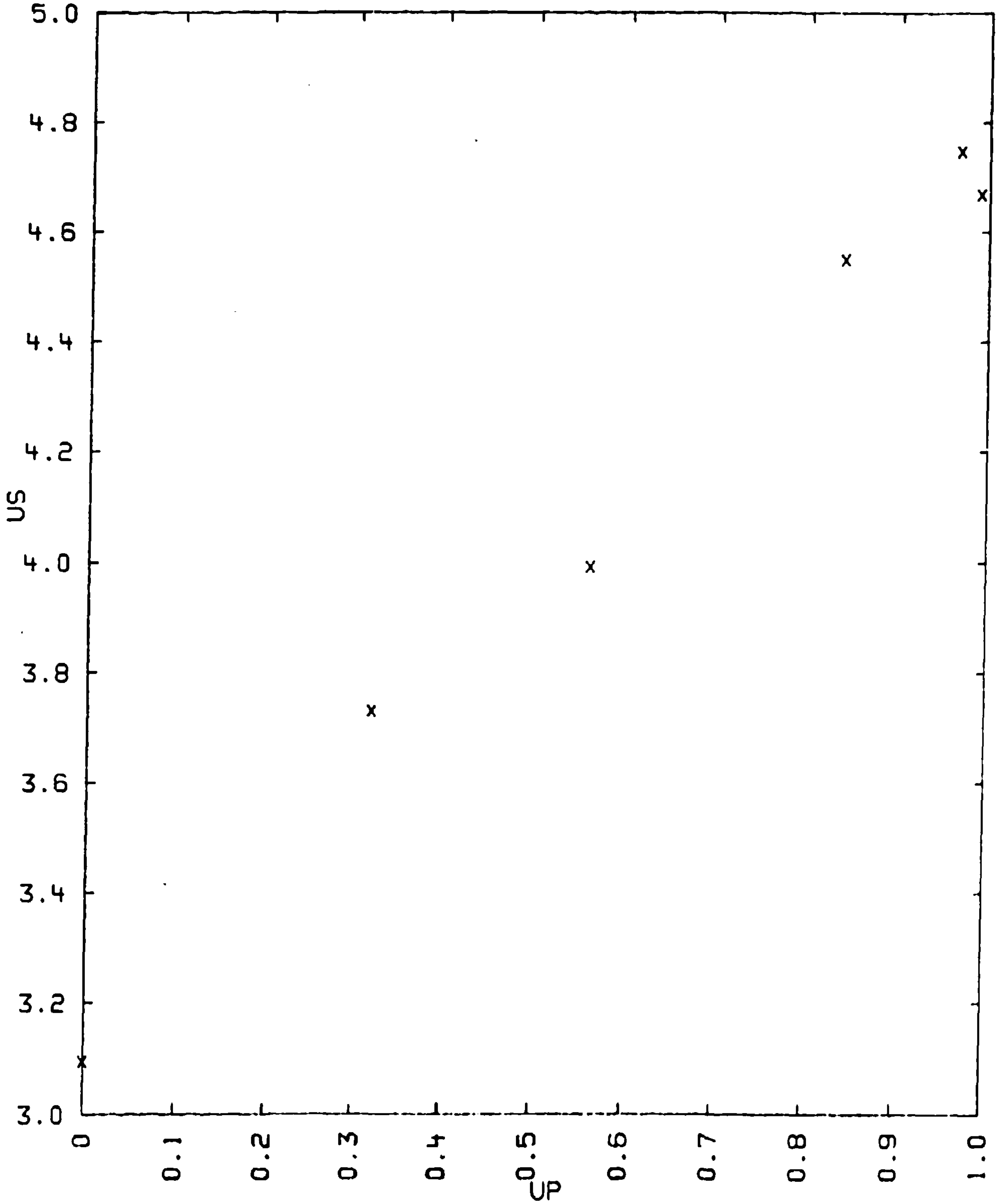
COMMENTS:

1) SOURCE: COLEBURN N. L. AND LIDDIARD JR. T. P.
J. CHEM. PHYS., VOL. 44, P. 1929 (1965)
ALSO: PRIVATE COMMUNICATION
2) EXPERIMENTAL TECHNIQUE C1
DATA REDUCTION METHOD B: UP=1/2*UP WAS ASSUMED FOR THE STANDARD MATERIALS BRASS AND PLEXIGLAS, SO THAT THE PRESSURE RELEASE ISENTROPE COULD BE OBTAINED BY REFLECTING THE P VS UP HUGONIOT IN THE LINE UP = 1/2*UFS
3) FOR BRASS US = 3.560 + 1.833*UP KM/SEC.
FOR PLEXIGLAS US = 2.710 + 1.568*UP - 0.037*UP**2
4) THE GRUNEISEN COEFFICIENT GAMMA = V(DP/DE) = 2.77
5) THE VALUE OF V01 WAS OBTAINED BY ASSUMING VOLUME ADDITIVITY OF THE VOLUMES OF THE COMPONENTS: RDX:V01 = 0.5494 CC/G
TNT:V01 = 0.6046 CC/G
AL :V01 = 0.3704 CC/G
WAX:V01 = 1.01 CC/G
6) C0 IS THE VELOCITY MEASURED ON VERY WEAK SHOCKS WITH AN UNCERTAINTY OF ABOUT 10 PERCENT

TABLE I

RDX/TNT/ALUMINUM/WAX (HBX-3) (EXPLOSIVE)

23-18-2-1(3-6-6-6)--23-18-2-1(



23-18-2-1(3-6-6-6)--23-18-2-1(7-3-5-6)--29---3
RDX/TNT/ALUMINUM/WAX (H-6) (EXPLOSIVE)

RDX	(-C(H2)-N(N-O2)-)3	44.76
TNT	-C(CH3)-C(N-O2)-(C(H2)-C(N-O2)-)2	29.53
ALUMINUM	AL	20.95
WAX	(C-H2)N UNCERTAIN	4.76

V0 = 0.5692 CC/G   C0 = 2.759 KM/SEC
V01= 0.5501 CC/G

THE TABLE LISTS DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS

TABLE

RHO0	US	UP	P	V/V0
1.760	3.970	0.560	39.1	0.859
-	4.482	1.005	79.3	0.776
-	4.450	0.985	77.1	0.779
-	2.76	0.000	0.0	1.000
-	2.82	0.000	0.0	1.000

US = A + B*UP   A = 2.832 KM/SEC,   SIGA = 0.068 KM/SEC.
SIG US = 0.12 KM/SEC   B = 1.695   SIGB = 0.083

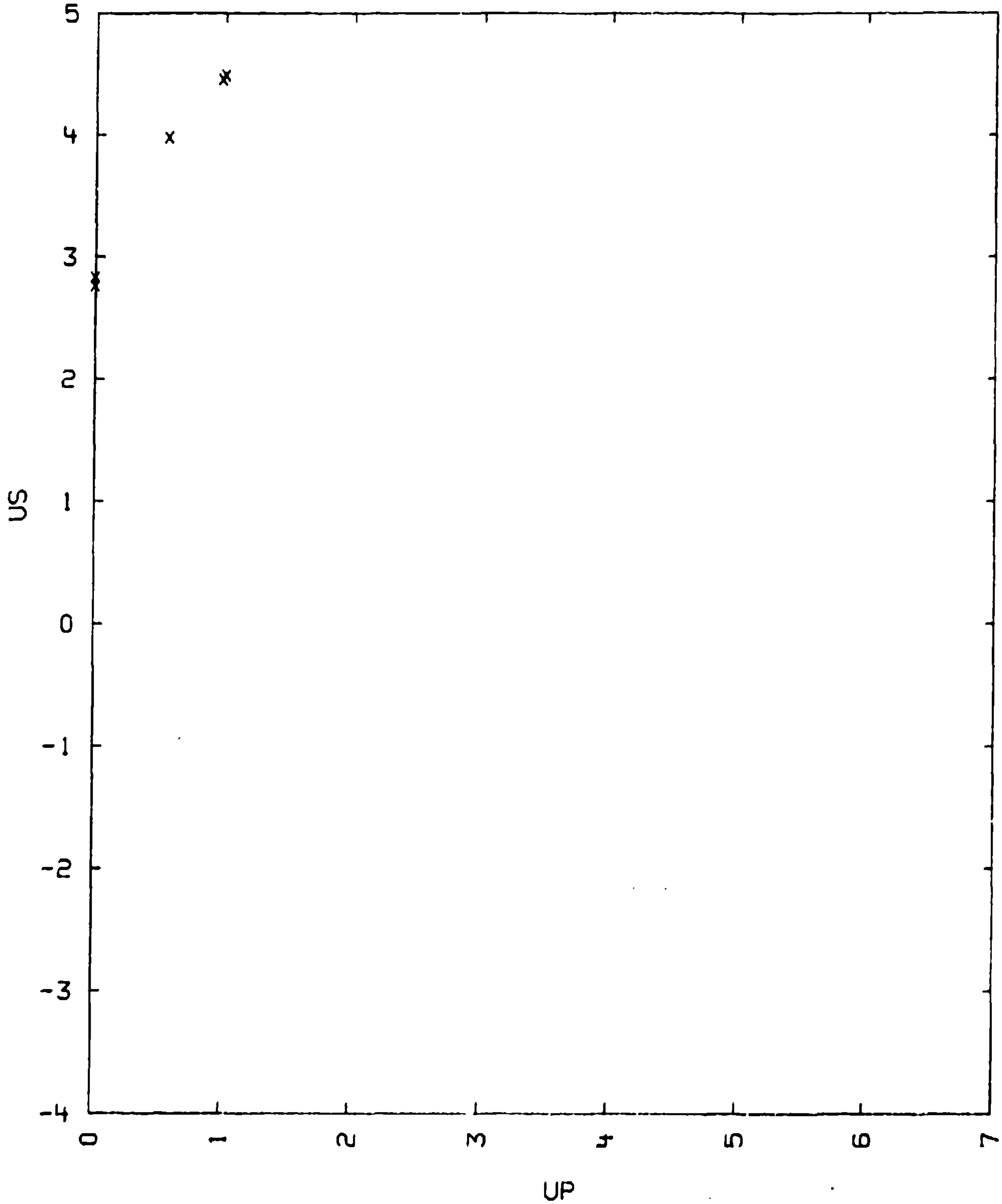
COMMENTS:

1) SOURCE: COLEBURN N. L. AND LIDDIARD JR. T. P.
J. CHEM. PHYS., VOL. 44, P. 1929 (1965)
ALSO: PRIVATE COMMUNICATION
2) EXPERIMENTAL TECHNIQUE C1
DATA REDUCTION METHOD B: UP=1/2*UP WAS ASSUMED FOR THE STANDARD MATERIALS BRASS AND PLEXIGLAS, SO THAT THE PRESSURE RELEASE ISENTROPE COULD BE OBTAINED BY REFLECTING THE P VS UP HUGONIOT IN THE LINE UP = 1/2*UFS
3) FOR BRASS US = 3.560 + 1.833*UP KM/SEC.
FOR PLEXIGLAS US = 2.710 + 1.568*UP - 0.037*UP**2
4) THE VALUE OF V0 WAS OBTAINED BY ASSUMING VOLUME ADDITIVITY OF THE VOLUMES OF THE COMPONENTS: RDX:V01 = 0.5494 CC/G
TNT:V01 = 0.6046 CC/G
AL :V01 = 0.3704 CC/G
WAX:V01 = 1.01 CC/G
5) C0 IS THE VELOCITY MEASURED ON VERY WEAK SHOCKS WITH AN UNCERTAINTY OF ABOUT 10 PERCENT

TABLE I

RDX/TNT/ALUMINUM/WAX (H-6) (EXPLOSIVE)

23-18-2-1(3-6-6-6)--23-18-2-1(



23-18-2-1(4-8-8-8)--23-9-2(10-13-7)---1
LX-04-1 (EXPLOSIVE) (PHBV 85/15)

HMX (-C(H2)-N(N-O2)-)4 = C4-N8-H8-O8 85 WT PERCENT
VITON (C10-F13-H7)N 15 WT PERCENT

V0 = 0.5373 CC/G
V0I= 0.5309 CC/G

IN THE TABLE BELOW DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS. L IS SAMPLE THICKNESS IN MM. AND PQ IS AN INDEPENDENT PRESSURE OBTAINED FROM A QUARTZ PRESSURE GAUGE. SEE COMMENTS. DELUS IS THE DIFFERENCE IN AVERAGE VELOCITY BETWEEN THE FOOT OF THE WAVE AND THE LISTED PRESSURE (COMMENTS)

TABLE

RHO0	US	UP	P	V/V0	L	PQ	DELUS
1.860	2.608	0.1038	5.04	0.9602	12.7	4.15	0.24
1.863	2.833	0.1738	9.17	0.9387	6.3	9.49	0.22
1.860	2.929	0.2346	12.78	0.9199	-	13.69	0.10
1.860	1.962	0.2502	9.13	0.8725	-	10.08	0.16
1.860	2.975	0.2880	15.93	0.9032	-	16.05	0.14
1.864	1.858	0.3124	10.82	0.8319	-	12.76	0.19
1.862	3.293	0.3616	22.16	0.8902	-	21.65	0.05

US = 2.36 + 2.43*UP KM/SEC
SIG.US = 0.06 KM/SEC.

COMMENTS:

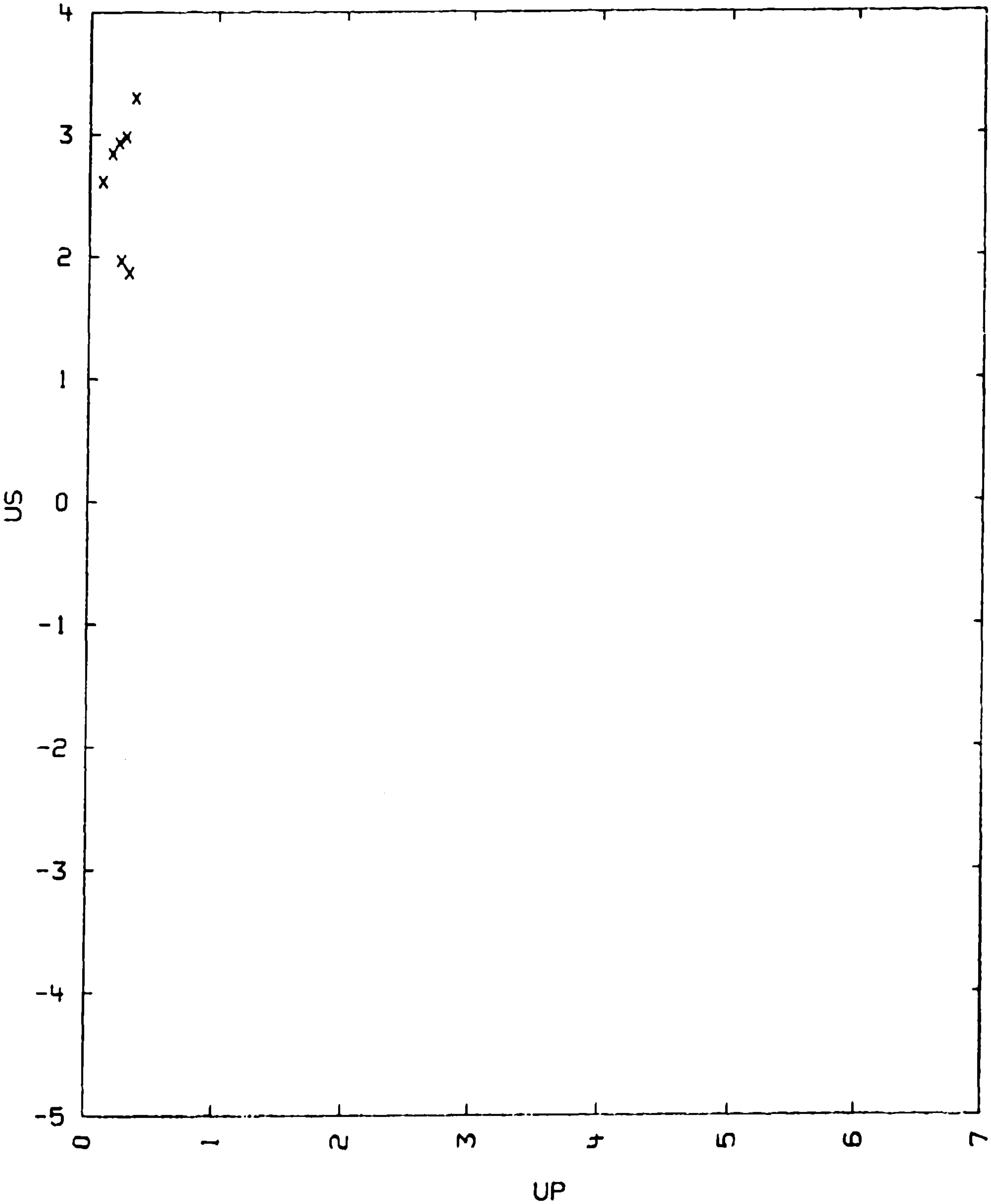
1) SOURCE: WASLEY R. J. AND OBRIEN J. F.
PRIVATE COMMUNICATION
LAWRENCE RAD. LAB., LIVERMORE, CALIFORNIA, U. S. A.
2) EXPERIMENTAL METHOD: A AND 12
DATA REDUCTION METHOD: A
THE PRESSURE WAS PRODUCED BY IMPACTING TWO SAMPLES OF LX-04-1, SO THAT UP = 1/2 PROJECTILE VELOCITY
3) FURTHER WORK IS IN PROGRESS ON THIS MATERIAL
4) THE WIDTH OF MOST SHOCK FRONTS MAKES CHOICE OF THE APPROPRIATE SHOCK VELOCITY TO BE USED IN THIS SIMPLE ANALYSIS UNCERTAIN. THE VALUE OF US USED CORRESPONDS TO THE TIME AT WHICH THE QUARTZ GAUGE READS 1/2 OF PEAK VOLTAGE. IN THE OPINION OF THE COMPILER THIS DOES NOT MAKE THE VALUE OF US UNCERTAIN BY MORE THAN 5 PERCENT FOR THE WIDEST SHOCK IN THE TABLE. THE ACCURACY OF PQ IS ALSO 5 PERCENT.
5) THE VALUE OF V0I WAS COMPUTED ASSUMING ADDITIVITY OF THE VOLUMES OF VITON (V0I = 1/1.81 CC/G) AND HMX WITH MONOCLINIC UNIT CELL .
A = 6.54 B = 11.05 C = 7.37 ANGSTROM BETHA = 102.8 DEGREES
AND 2 MOLECULES PER UNIT CELL
SEE P. F. EILAND AND R. PEPINSKY Z. KRISTALLOGRAPHY, VOL. 106 P. 274 (1955)

6) THE RELATIVELY LOW PRESSURE OBSERVED IN THE 4TH AND 6TH ENTRY ABOVE ARE NOT EXPLAINED. BUT THESE SHOTS WERE NOT USED IN THE LEAST SQUARE FITS

TABLE I

LX-04-1 (EXPLOSIVE) (PHBV 85/15)

23-18-2-1(4-8-8-8)--23-9-2(10-



23-18-2-1(4-8-8-8)--23-18-2-1(7-3-5-6)---1
OCTOL (EXPLOSIVE)

HMX (EXPLOSIVE)
(-C(H2)-N(N-O2)-14 = C4-N8-H8-O8 65 WT PERCENT
TNT (TRINITROTOLUENE)
(N-O2)3-C6(H2)-C-H3 = C7-N3-H5-O6 35 WT PERCENT

V0 = 0.560 CC/G
V01 = 0.553 CC/G

IN THE TABLE BELOW DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS. X DENOTES BRASS STANDARD THICKNESS IN CM.

TABLE

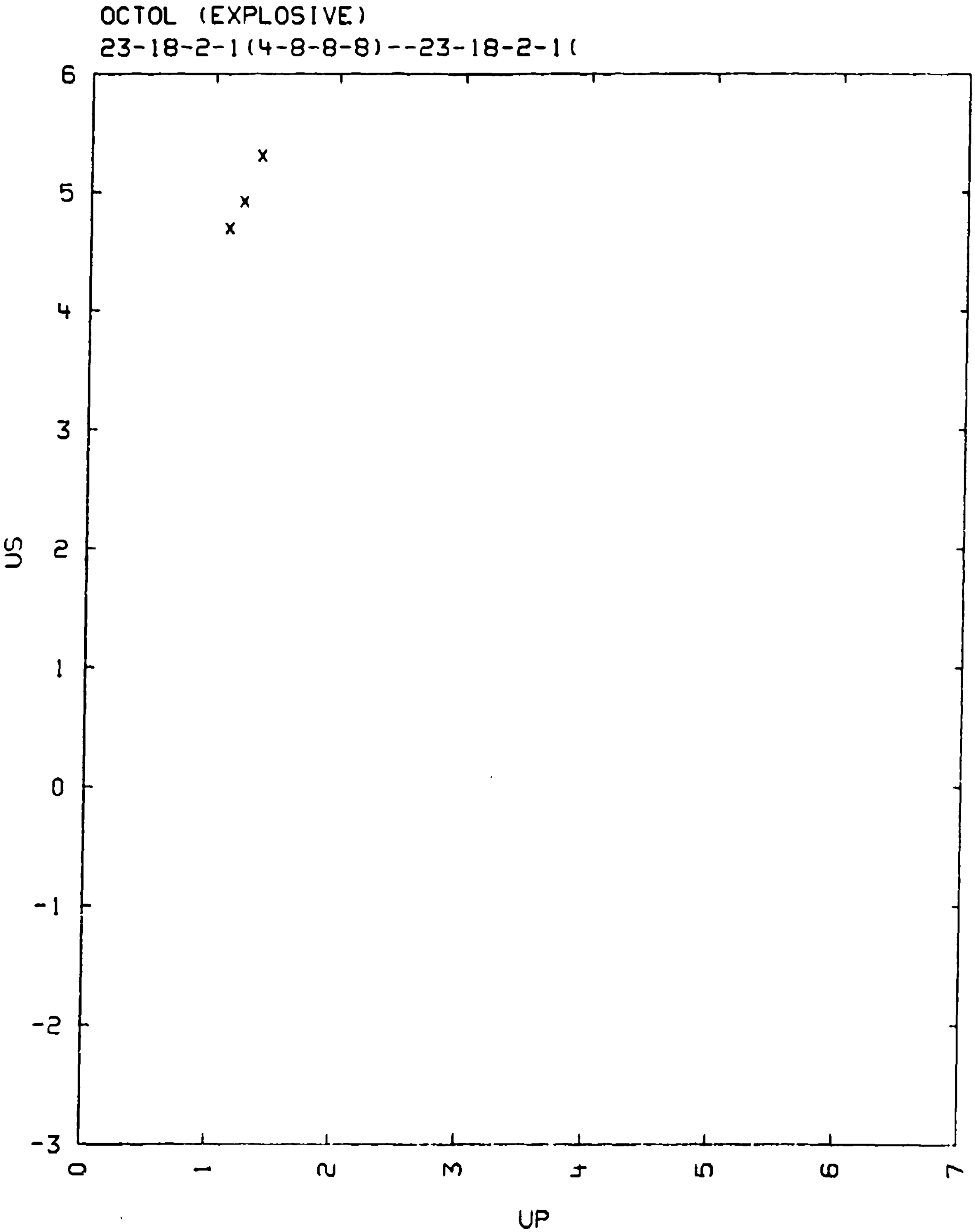
RHO0	X	US	UP	P	V/V0
1.787	1.267	5.30	1.375	130.0	0.741
-	2.494	4.91	1.239	108.6	0.748
-	3.759	4.69	1.118	93.6	0.762

US = 2.00 + 2.38*UP +OR- 0.13 KM/SEC

COMMENTS:

1) SOURCE: MAJOWICZ, M. J. AND JACOBS, S. J.
NAVORD REPORT NO. 5710, 1958
U.S. NAVAL ORDNANCE LAB., WHITE OAK, MARYLAND, U.S.A.
2) EXPERIMENTAL TECHNIQUE C
DATA REDUCTION TECHNIQUE B. WHERE UP = 1/2(UFS). IT WAS ASSUMED THE RELEASE ISENTROPE WAS A STRAIGHT LINE WITH SLOPE RHO0(US).
STANDARD MATERIAL BRASS.
3) US IS THE VELOCITY AT ZERO THICKNESS OF THE EXPLOSIVE OBTAINED BY EXTRAPOLATING THE VELOCITY VERSUS THICKNESS CURVE OBTAINED FROM A WEDGE OF EXPLOSIVE.
4) THE DETONATION VELOCITY IS 8.17 KM/SEC. SIGMA = 0.01 KM/SEC.
THIS VELOCITY WAS REACHED AT THICKNESS BETWEEN 1.8-3.5 MM DEPENDING ON INPUT PRESSURE.
5) THE VALUE OF V01 WAS OBTAINED BY ASSUMING VOLUME ADDITIVITY OF THE VOLUME OF THE COMPONENTS: HMX:V01 = 0.5263, TNT:V01 = 0.6046 CC/G.

TABLE I


OCTOL (EXPLOSIVE)
23-18-2-1(4-8-8-8)--23-18-2-1(
US
UP
6
5
4
3
2
1
0
-1
-2
-3
0
1
2
3
4
5
6
7

23-18-2-1(4-8-8-8)--23-18-2-1(7-3-5-6)---2
OCTOL, CAST (EXPLOSIVE)

HMX (-C(H2)-N(N-O2)-)4 = C4-N8-H8-O8 75 WT PERCENT
TNT -C(C-H3)-C(N-O2)(-C(H)-C(N-O2)-)2 = C7-N3-H5-O6 25 - - - -

VO = 0.555 CC/G
VOI = 0.547 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UP	P	V/VO
1.803	4.68	1.05	88.6	0.776
-	4.49	0.84	68.0	0.813
-	4.34	0.86	67.3	0.802
-	4.06	0.71	52.0	0.825
-	3.94	0.72	51.1	0.817
-	3.45	0.53	32.9	0.846
-	3.50	0.53	33.4	0.849
-	3.25	0.41	24.0	0.874
-	3.09	0.43	23.9	0.861
-	4.89	1.09	96.1	0.777
-	4.77	1.10	94.6	0.769
-	4.99	1.09	98.1	0.782
-	4.95	1.09	97.3	0.780
-	4.15	0.79	59.1	0.809
-	4.44	0.78	62.4	0.824
-	4.42	0.78	62.2	0.824

US = 2.21 + 2.51*UP KM/SEC
SIGMA US = 0.14 KM/SEC

COMMENTS:

1) SOURCE: BOYLE, V. M.
PRIVATE COMMUNICATION
BALLISTIC RESEARCH LABORATORIES. AMXBR-TD
ABERDEEN PROVING GROUND, MARYLAND 21005.

2) EXPERIMENTAL TECHNIQUE: THE SHOCK VELOCITY IN THE SAMPLE WAS MEASURED BY A SMEAR CAMERA THAT SWEPT THE SHADOWGRAPH OF A TRANSPARENT CHANNEL IN THE SAMPLE ACROSS THE FILM PLANE. THE CHANNEL WAS MADE BY SPLITTING THE SAMPLE IN TWO ALONG THE SHOCK DIRECTION AND SEPARATING THE TWO HALVES BY A THIN (0.127 MM) TRANSPARENT PLASTIC SHEET (EXTRUDED ACETATE).

DATA REDUCTION TECHNIQUE: B
STANDARD MATERIALS USED:
ALUMINUM, 2024-T4, US = 5.360 + 1.351*UP KM/SEC
RHO = 2.785 G/CC
PLEXIGLASS,US = 2.702 + 1.544*UP, KM/SEC, RHO = 1.184 G/CC
UP = 1/2 UFS WAS ASSUMED FOR THE STANDARD MATERIALS SO THAT

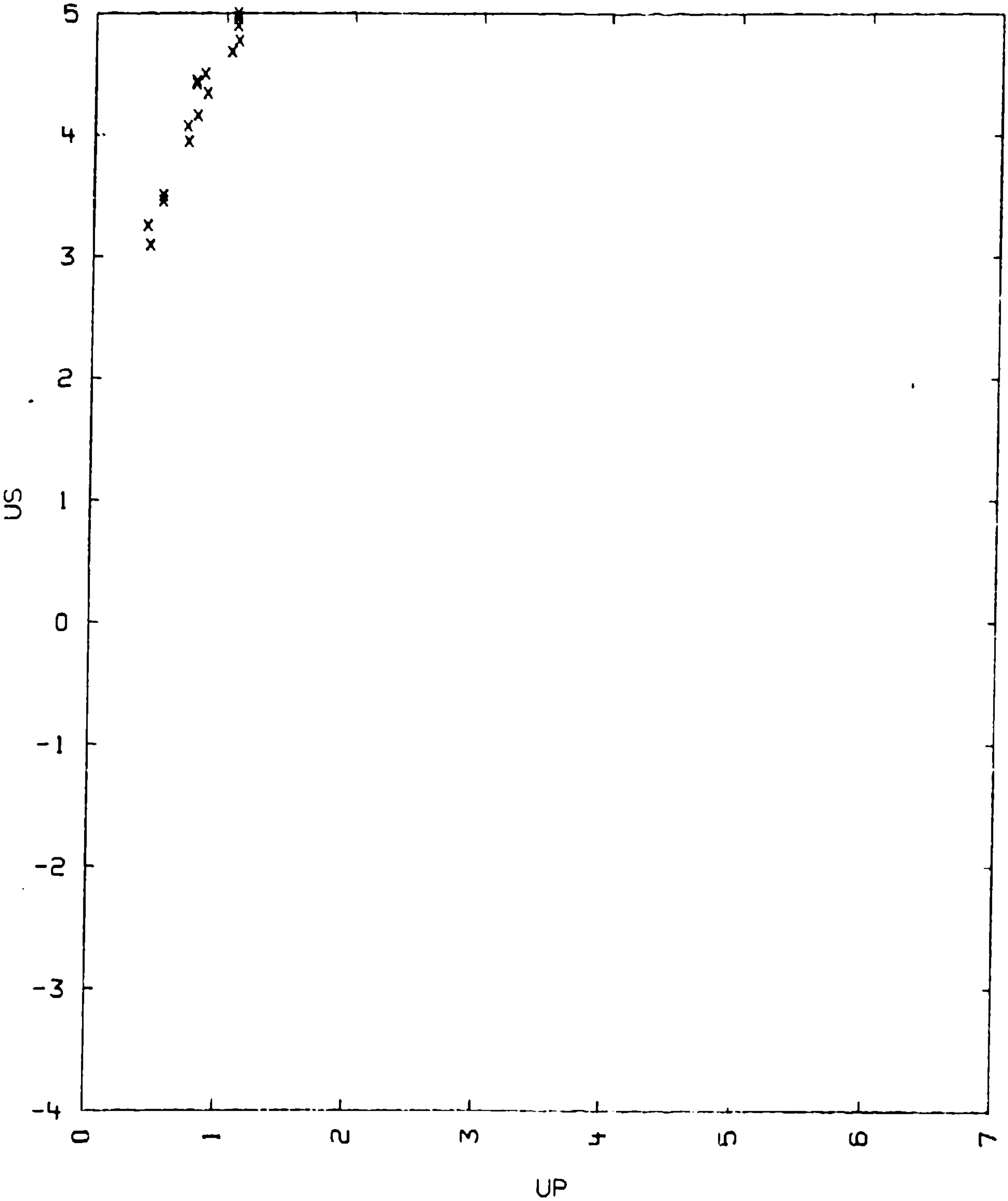
THE PRESSURE ISENTROPE COULD BE OBTAINED BY REFLECTING THE P VS. UP HUGONIOT IN THE LINE UP = 1/2 UFS.

3) THE DEGREE TO WHICH THE RESULTS MAY BE AFFECTED BY CHEMICAL REACTION OF THE SHOCKED EXPLOSIVE SAMPLE HAS NOT BEEN DETERMINED AT THIS TIME.

4) VOI WAS CALCULATED ASSUMING VOLUME ADDITIVITY OF THE COMPONENTS:
VOI(TNT) = 0.6046 CC/G, HANDBOOK OF CHEM. AND PHYS. (CHEM. RUBBER PUBL. CO. 1964) 45TH ED.
VOI(HMX) = 0.5280 CC/G, P. F. EILAND AND R. PEPINSKY Z. KRISTALLOGRAPHY, V. 106, P. 274 (1955).

TABLE I

OCTOL, CAST (EXPLOSIVE)
23-18-2-1(4-8-8-8)--23-18-2-1(



23-18-2-1(5-4-8-12)--23-18-2-1(7-3-5-6)---1
PENTOLITE (EXPLOSIVE)

PETN (PENTAERYTHRITOLTETRANITRATE)
C(C(H)2-N-O3)4 = C5-N4-H8-O12 50 WT PERCENT
TNT (TRINITROTOLUENE)
(N-O2)3-C6(H2)-C-H3 = C7-N3-H5-O6 50 WT PERCENT

V0 = 0.5967 CC/G
V01 = 0.6024 CC/G

IN THE TABLE BELOW DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS. X DENOTES BRASS STANDARD THICKNESS IN CM.

TABLE

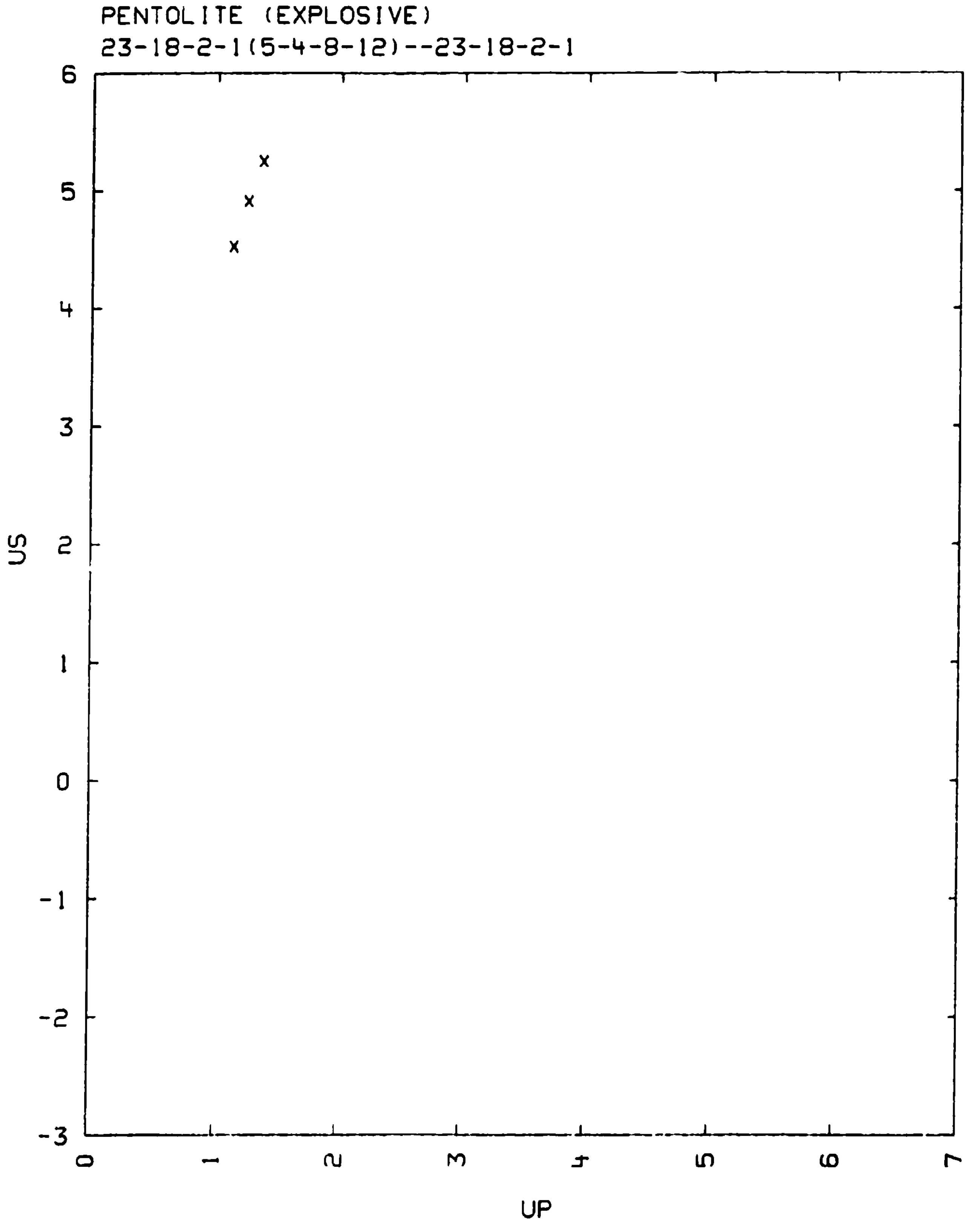
RHO0	X	US	UP	P	V/V0
1.676	1.285	5.25	1.364	120.3	0.7402
-	2.502	4.90	1.252	102.8	0.7445
-	3.762	4.52	1.136	86.1	0.7487

US = 0.885 + 3.20*UP +OR- 0.04 KM/SEC

COMMENTS:

1) SOURCE: MAJOWICZ, M. J. AND JACOBS, S. J.
NAVORD REPORT NO. 5710, 1958
U.S. NAVAL ORDNANCE LAB., WHITE OAK, MARYLAND, U.S.A.
2) EXPERIMENTAL TECHNIQUE C
DATA REDUCTION TECHNIQUE B. WHERE UP = 1/2(UFS). IT WAS ASSUMED THE RELEASE ISENTROPE WAS A STRAIGHT LINE WITH SLOPE RHO0(US).
STANDARD MATERIAL BRASS
3) US IS THE VELOCITY AT ZERO THICKNESS OF THE EXPLOSIVE OBTAINED BY EXTRAPOLATING THE VELOCITY VERSUS THICKNESS CURVE OBTAINED FROM A WEDGE OF EXPLOSIVE.
4) THE DETONATION VELOCITY IS 7.53 KM/SEC, SIGMA = 0.02 KM/SEC.
THIS VELOCITY WAS REACHED AT THICKNESS BETWEEN 3-4.5 MM DEPENDING ON INPUT PRESSURE.
5) THE VALUE OF V01 WAS OBTAINED BY ASSUMING VOLUME ADDITIVITY OF THE VOLUME OF THE COMPONENTS: PETN:V01 = 0.6068, TNT:V01 = 0.6064 CC/G.

TABLE I


PENTOLITE (EXPLOSIVE)
23-18-2-1(5-4-8-12)--23-18-2-1
US
UP
6
5
4
3
2
1
0
-1
-2
-3
0
1
2
3
4
5
6
7

24-1--2-1---1
SANO-WATER MIXTURE (20 PERCENT SATURATED)

SI-O2 96 PERCENT BY WT.
H2-O 4 PERCENT BY WT.
POROSITY 30 PERCENT BY VOLUME
PARTICLE SIZE 74-149 MICRONS

V0 = 0.581 CC/G.

IN THE TABLE BELOW, TEMPERATURE (T0) IS GIVEN IN DEGREES CENTIGRADE, DENSITY IS IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

T0	RHO0	US	UP	P	V/V0
-10	1.72	2.98	1.14	58	0.618
-10	1.72	4.34	2.05	153	0.528
-10	1.72	4.24	2.12	156	0.500
-10	1.72	5.39	3.04	282	0.436
-10	1.72	5.99	3.49	360	0.417
-10	1.72	6.43	3.74	413	0.418

US = 1.56 + 1.28*UP KM/SEC   SIGMA US = 0.10 KM/SEC

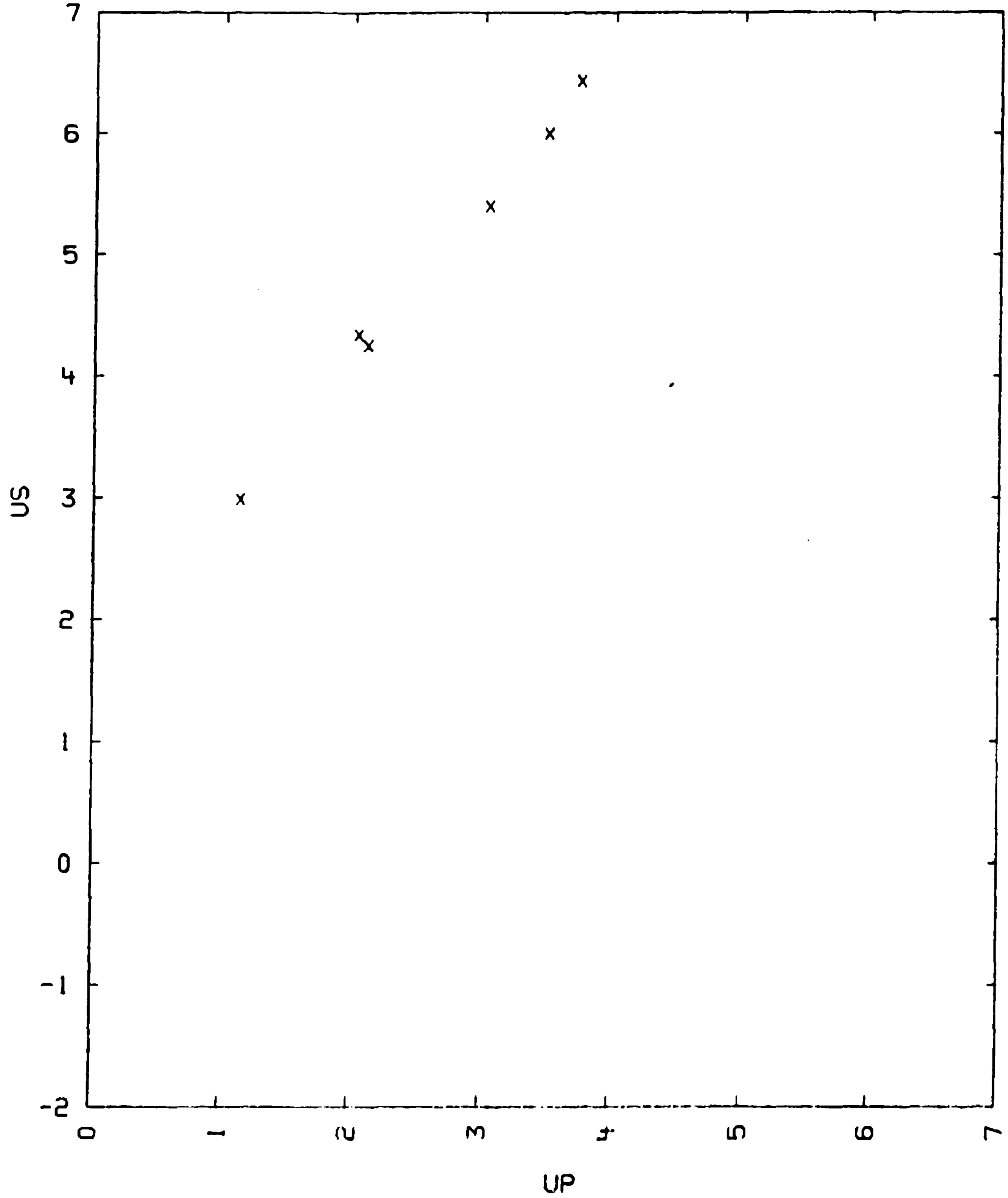
COMMENTS:

1) SOURCE: ANDERSON, G. D.
INTERIM DATA REPORT FGU-6392 (1967)
STANFORD RESEARCH INSTITUTE, MENLO PARK, CALIFORNIA, USA.
2) EXPERIMENTAL TECHNIQUE D.
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL 2024 ALUMINUM
3) THE SAMPLE WAS OTTAWA BANDING SAND, OBTAINED FROM THE OTTAWA SILICA CO., OTTAWA, ILLINOIS, U.S.A.
4) THE WT.PERCENT VALUES WERE CALCULATED FROM THE AUTHORS DENSITY OF DRY SAND (1.65 G/CC) AND THE DENSITY OF THIS WET SAND (RHO0 = 1.72 G/CC AT 25 DEG. CENTIGRADE).
THE POROSITY WAS CALCULATED ASSUMING AS ABOVE, THAT THE SAND DOES NOT EXPAND WHEN WATER IS ADDED AND FROZEN AND THAT 100 PERCENT SATURATED SAND WITH RHO0 = 2.02 G/CC AT 25 DEG. CENTIGRADE IS VOID FREE.

TABLE I

SAND-WATER MIXTURE (20 PERCENT SATURATED)

24-1--2-1---1



24-1--2-1---2
SAND-WATER MIXTURE (50 PERCENT SATURATED)

SI-O2 90 PERCENT BY WT.
H2-O 10 PERCENT BY WT.
POROSITY 16 PERCENT BY VOLUME
PARTICLE SIZE 74-149 MICRONS

VO = 0.534 CC/G.

IN THE TABLE BELOW. TEMPERATURE (TO) IS GIVEN IN DEGREES CENTIGRADE. DENSITY IN G/CC. VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

TO	RHOO	US	UP	P	V/VO
-10	1.84	3.40	1.11	69.5	0.674
-10	1.84	4.66	1.98	170	0.575
-10	1.84	5.32	2.79	273	0.475
-10	1.84	5.73	3.08	325	0.462
-10	1.84	6.37	3.44	403	0.460

US = 2.11 + 1.20*UP KM/SEC   SIGMA US = 0.16 KM/SEC

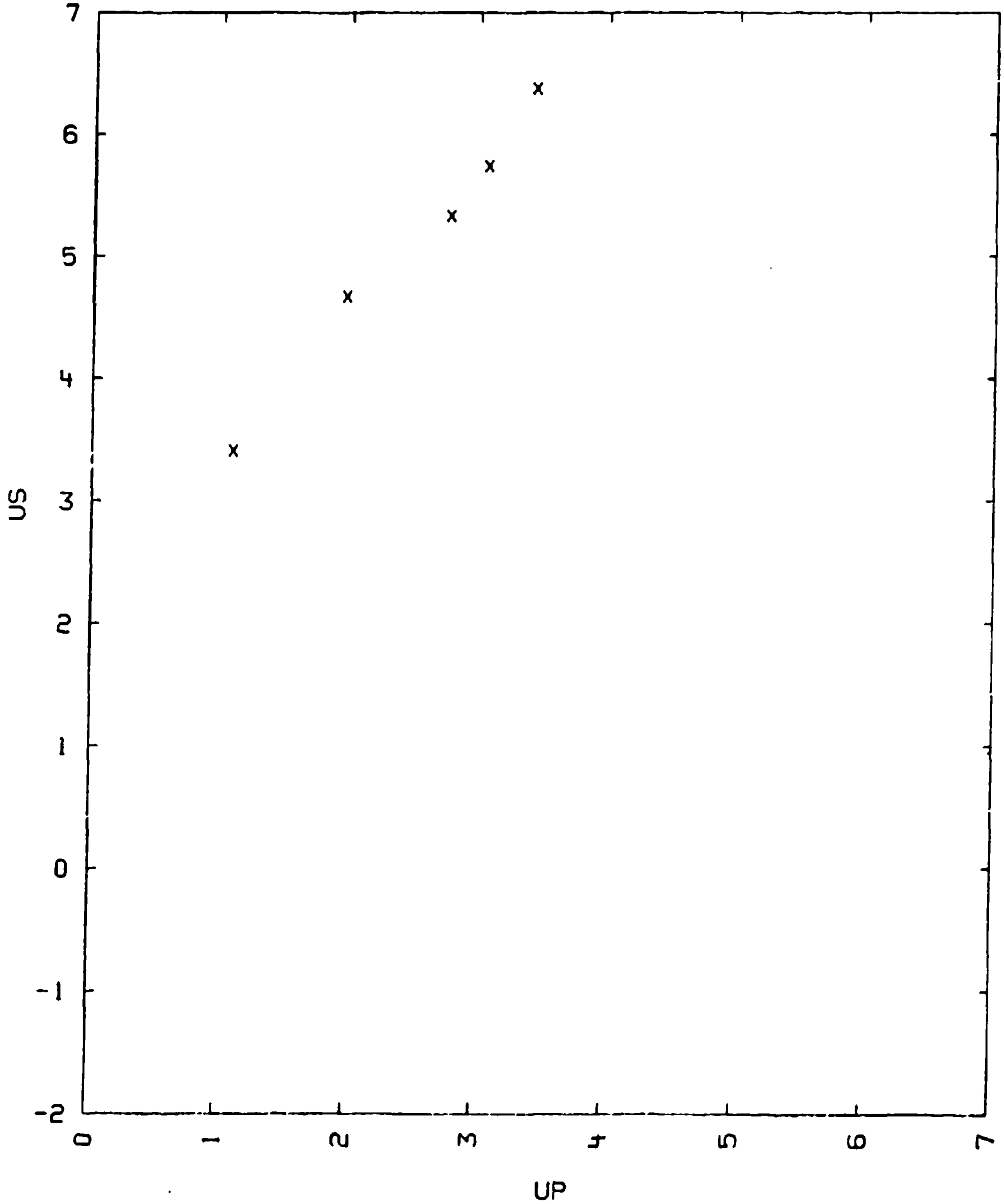
COMMENTS:

1) SOURCE: ANDERSON, G. D.
INTERIM DATA REPORT FGU-6392 (1967)
STANFORD RESEARCH INSTITUTE, MENLO PARK, CALIFORNIA, USA.
2) EXPERIMENTAL TECHNIQUE D.
DATA REDUCTION TECHNIQUE B.
STANDARD MATERIAL 2024 ALUMINUM
3) THE SAMPLE WAS OTTAWA BANDING SAND, OBTAINED FROM THE OTTAWA SILICA CO., OTTAWA, ILLINOIS, U.S.A.
4) THE WT.PERCENT VALUES WERE CALCULATED FROM THE AUTHORS DENSITY OF DRY SAND (1.65 G/CC) AND THE DENSITY OF THIS WET SAND (RHOO = 1.84 G/CC AT 25 DEG. CENTIGRADE).
THE POROSITY WAS CALCULATED ASSUMING AS ABOVE, THAT THE SAND DOES NOT EXPAND WHEN WATER IS ADDED AND FROZEN AND THAT 100 PERCENT SATURATED SAND WITH RHOO = 2.02 G/CC AT 25 DEG. CENTIGRADE IS VOID FREE.

TABLE I

SAND-WATER MIXTURE (50 PERCENT SATURATED)

24-1--2-1---2



24-1--2-1---3
SAND-WATER MIXTURE (100 PERCENT SATURATED)

SI-O2 81 PERCENT BY WT.
H2-O 19 PERCENT BY WT.
PARTICLE SIZE 74-149 MICRONS

TO = -10 DEGREES CENTIGRADE
VO = 0.510 CC/G

IN THE TABLE BELOW, TEMPERATURE (TO) IS GIVEN IN DEGREES CENTIGRADE, DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

TO	RHOO	US	UP	P	V/VO
-10	1.96	3.77	1.03	76	0.727
-10	1.96	4.00	1.01	80	0.747
-10	1.96	3.86	1.05	80	0.728
-10	1.96	5.10	2.01	201	0.606
-10	1.96	5.77	2.67	303	0.537
-10	1.96	5.63	2.71	300	0.519
-10	1.96	5.96	2.85	333	0.522
-10	1.96	6.74	3.24	429	0.5[illegible]
-10	1.96	6.77	3.31	440	0.[illegible]
-10	1.96	7.04	3.52	487	0.[illegible]

US = 2.56 + 1.24*UP KM/SEC SIGMA US = 0.[illegible]

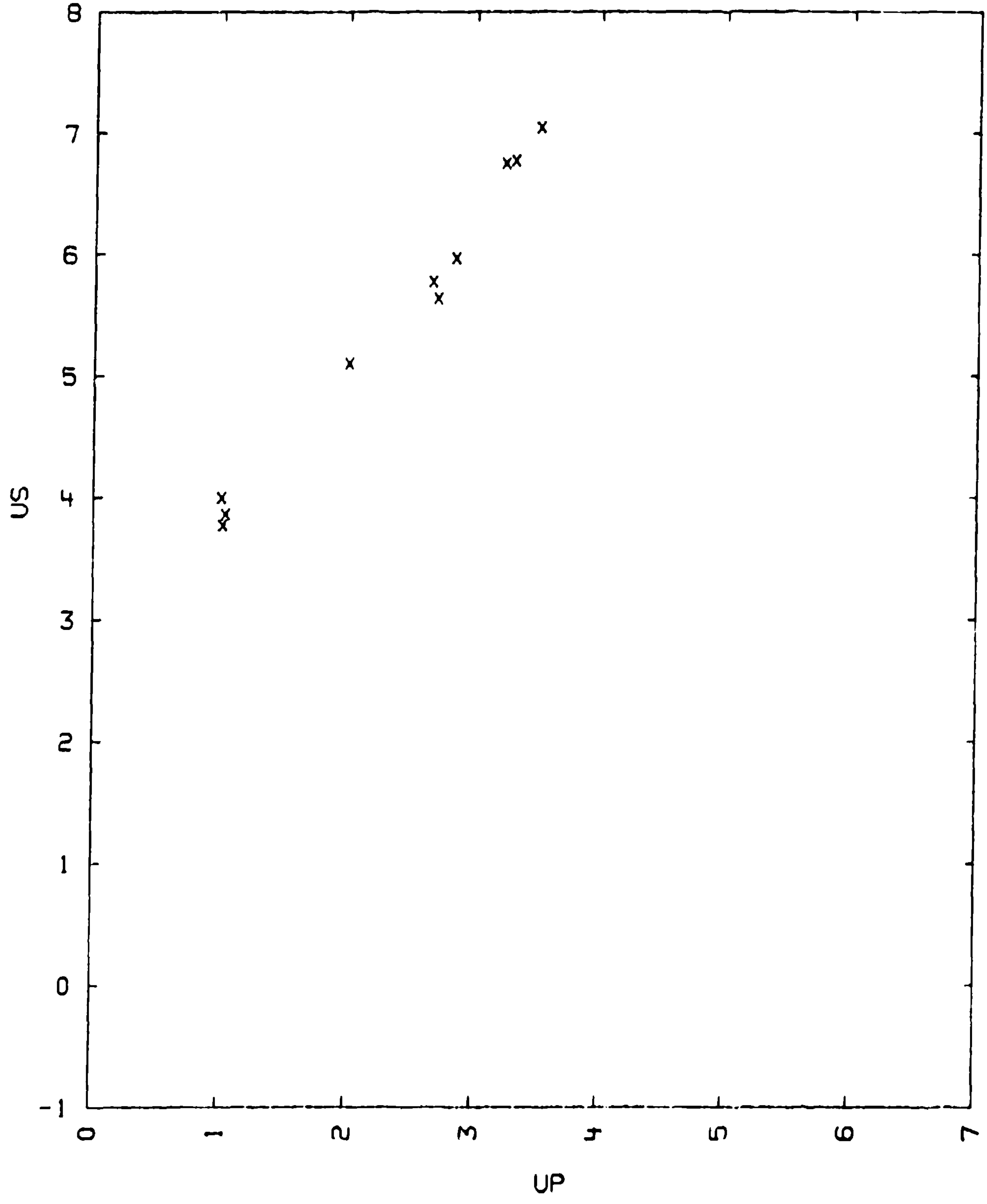
COMMENTS:

1) SOURCE: ANDERSON, G. D.
INTERIM DATA REPORT FGU-6392 (1967)
STANFORD RESEARCH INSTITUTE, MENLO PARK, CALIFORNIA, USA.
2) EXPERIMENTAL TECHNIQUE D.
DATA REDUCTION TECHNIQUE B.
STANDARD MATERIAL 2024 ALUMINUM
3) THE SAMPLE WAS OTTAWA BANDING SAND, OBTAINED FROM THE OTTAWA SILICA CO., OTTAWA, ILLINOIS, U.S.A.
4) THE SPECIMEN CHARACTERISTICS BEFORE COOLING:
SI-O2 82 PERCENT BY WT.
H2-O 18 PERCENT BY WT.
THE SAMPLE EXPANDS WHEN THE WATER IN IT FREEZES. THE INCREASE IN THE VOLUME IS ASSUMED TO BE DUE TO THE INCREASE IN VOLUME OF THE WATER WHEN IT FREEZES. THE DENSITY OF ICE AT -10 DEG. CENTIGRADE WAS TAKEN AS 0.917 G/CC.

TABLE I

SAND-WATER MIXTURE (100 PERCENT SATURATED)

24-1--2-1---3



24-1--23-2-1(7-6-2)---1
PHENOLIC REFRASIL

PHENOLIC (C7-H6-O2)N 0.60 - 0.54 WT PERC[illegible]
QUARTZ FIBER SI-O2 0.40 - 0.46 WT PERCENT

VO = 0.589 - 0.614 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

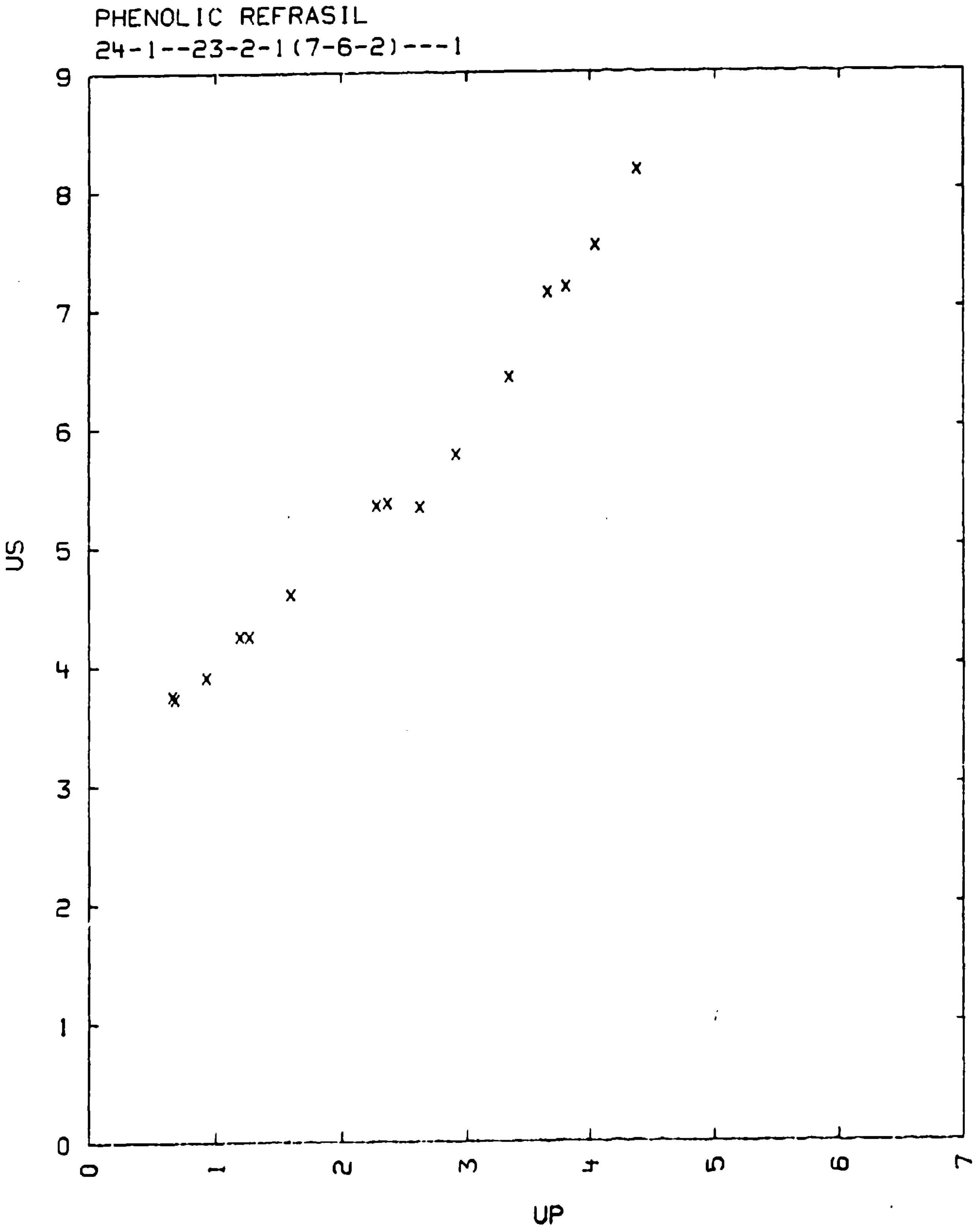
SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
1.667	3.74	0.66	41.	0.8235	2024 AL	5.95
1.641	3.72	0.68	42.	0.8172	2024 AL	5.96
1.647	3.90	0.93	60.	0.7615	2024 AL	6.20
1.699	4.24	1.20	86.	0.7170	2024 AL	6.48
1.642	4.24	1.27	88.	0.7005	2024 AL	6.53
1.645	4.60	1.60	121.	0.6522	2024 AL	6.87
1.637	5.34	2.28	199.	0.5730	2024 AL	7.56
1.646	5.36	2.37	209.	0.5578	2024 AL	7.65
1.646	5.32	2.63	230.	0.5056	2024 AL	7.88
1.645	5.77	2.91	276.	0.4957	2024 AL	8.19
1.643	6.42	3.34	352.	0.4798	2024 AL	8.67
1.650	7.13	3.66	431.	0.4867	2024 AL	9.08
1.651	7.18	3.81	452.	0.4694	2024 AL	9.22
1.643	7.53	4.04	500.	0.4635	2024 AL	9.48
1.630	8.17	4.38	583.	0.4639	2024 AL	9.88

US = 3.016 + 1.005*UP KM/SEC FOR UP BELOW 2.5 KM/SEC
SIG US = 0.044 KM/SEC
US = 1.070 + 1.616*UP KM/SEC FOR UP ABOVE 2.5 KM/SEC
SIG US = 0.078 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B
3) THE COMPOSITION WAS CALCULATED ASSUMING VOLUME ADDITIVITY OF THE COMPONENTS AND PHENOLIC AND QUARTZ FIBER FILTER DENSITIES OF 1.3 AND 2.66 G/CC RESPECTIVELY. THE COMPOSITION RANGE IS THEREFORE DUE TO THE OBSERVED DENSITY RANGE ONLY. THE SAMPLE CONSISTS OF OBLIQUE WOUND QUARZ FIBBER TAPE AND PHENOLIC

TABLE I



24-1--28-1---1
PYREX

SI-02	80.4 - 81.4	WT PERCENT
B2-03	13.0 - 10.5	- -
AL2-03	3.5 - 1.5	- -
CA-O	0.13 - 0.7	- -
MGO	0.06 - 0.6	- -
NA2-O	3.2 - 5.1	- -
K2-O	0.2 - 1.8	- -
AS2-03	0.5 - 0.75	- -

VO = 0.448 CC/G   CL = 5.55 KM/SEC   CO = 3.88 KM/SEC
CS = 3.45 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

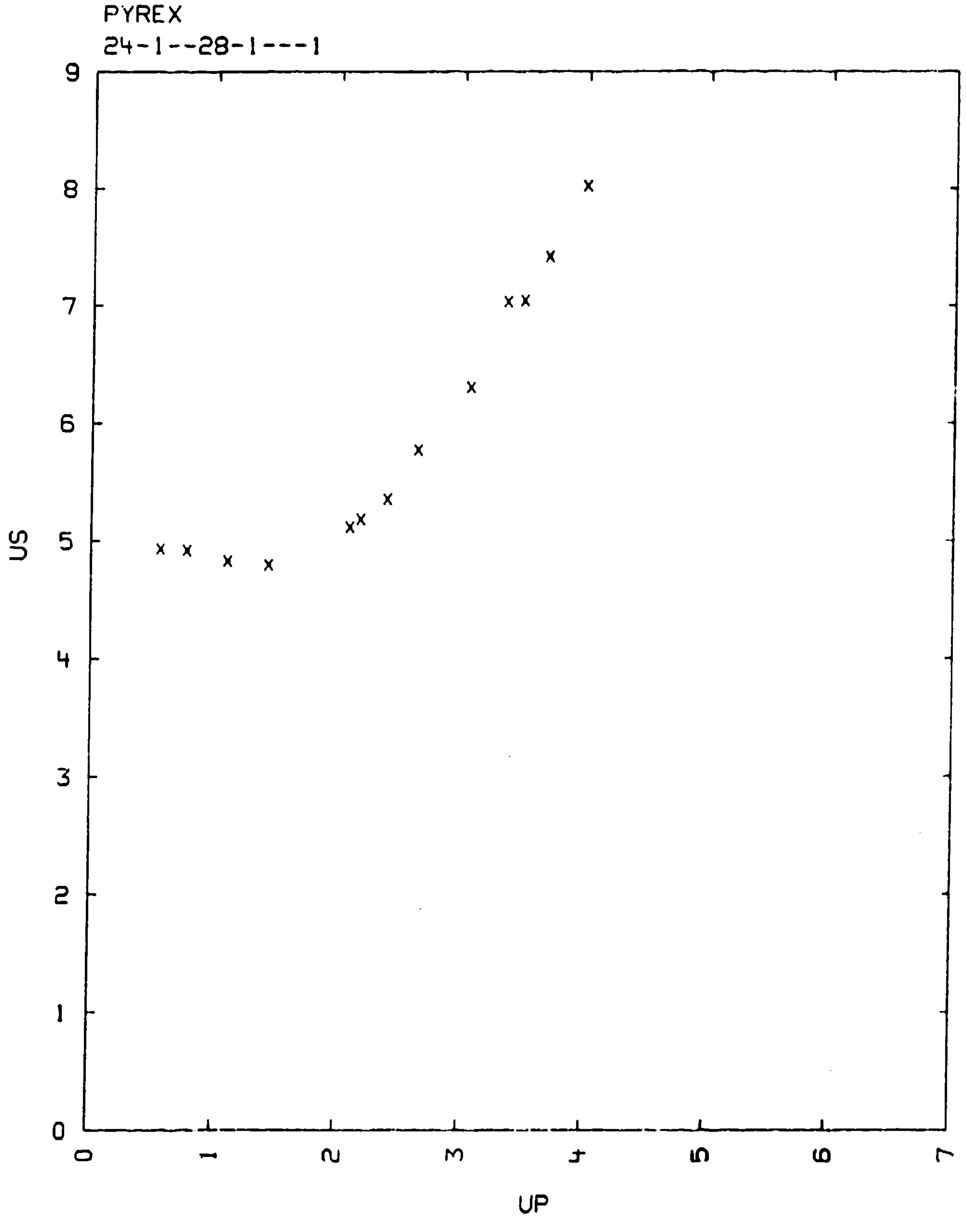
SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
2.230	4.93	0.56	62.	0.8864	2024 AL	5.96
2.230	4.91	0.78	85.	0.8411	2024 AL	6.20
2.230	4.82	1.11	119.	0.7697	2024 AL	6.53
2.230	4.79	1.44	154.	0.6994	2024 AL	6.87
2.230	5.11	2.10	239.	0.5890	2024 AL	7.56
2.230	5.18	2.19	253.	0.5772	2024 AL	7.65
2.230	5.35	2.40	286.	0.5514	2024 AL	7.88
2.230	5.77	2.65	341.	0.5407	2024 AL	8.19
2.230	6.30	3.06	430.	0.5143	2024 AL	8.67
2.230	7.03	3.35	525.	0.5235	2024 AL	9.08
2.230	7.04	3.49	548.	0.5043	2024 AL	9.22
2.230	7.41	3.69	610.	0.5020	2024 AL	9.48
2.230	8.02	3.99	714.	0.5025	2024 AL	9.88

US = 1.353 + 1.654*UP KM/SEC FOR UP ABOVE 2.3 KM/SEC
SIG US = 0.10 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B
3) COMPOSITION FROM M.B. VOLF, D. SC. - TECHNICAL GLASSES (SIR ISAAC PITMAN AND SONS, LTD., LONDON, 1961) P. 130

TABLE I



24-1--99-94-29-24-1--100-93-41-29-24-2-1--100-29-24-2-1---1
GNEIS

QUARTZ	SI-02		35 VOL. PERCENT
PLAGIOCLASE			21-22 - -
ALBITE	NA-AL-SI3-08	90-50 MOL. PERCENT	
ANORTHITE	CA-AL2-SI2-08	10-50 - -	
BIOTITE	K(MG,FE)3(AL-SI3-010)(0-H)2		15-20 - -
MUSCOVITE	K-AL2(AL-SI3-010)(0-H)2		15-10 - -
CHLORITE	MG3(SI4-010)(0-H)2-MG3(0-H)6		7 - -
GARNET	(MG,FE,MN,CA)3-(AL,FE,CR)2-(SI-04)3		5 - -
PYRITE	FE-S2		1-.5 - -
MAGNETITE	FE3-04		1-.5 - -
GRAIN SIZE			0.1 - 2. MM

V0 = 0.358 CC/G
V0I=

THE TABLE LISTS DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURES IN KBAR.

TABLE

RHO0	US	UP	P	V/V0
2.79	6.57	2.56	469.	0.611
-	7.63	3.17	667.	0.576
-	8.47	3.74	885.	0.558
-	8.74	3.98	970.	0.545
-	8.99	3.99	1000.	0.557
-	9.08	4.27	1082.	0.530
-	9.22	4.34	1117.	0.529
-	9.47	4.42	1169.	0.533
-	11.35	5.25	1673.	0.537
-	11.99	6.08	2034.	0.493

US = 2.49 + 1.593*UP KM/SEC.
SIG.US = 0.22 KM/SEC.

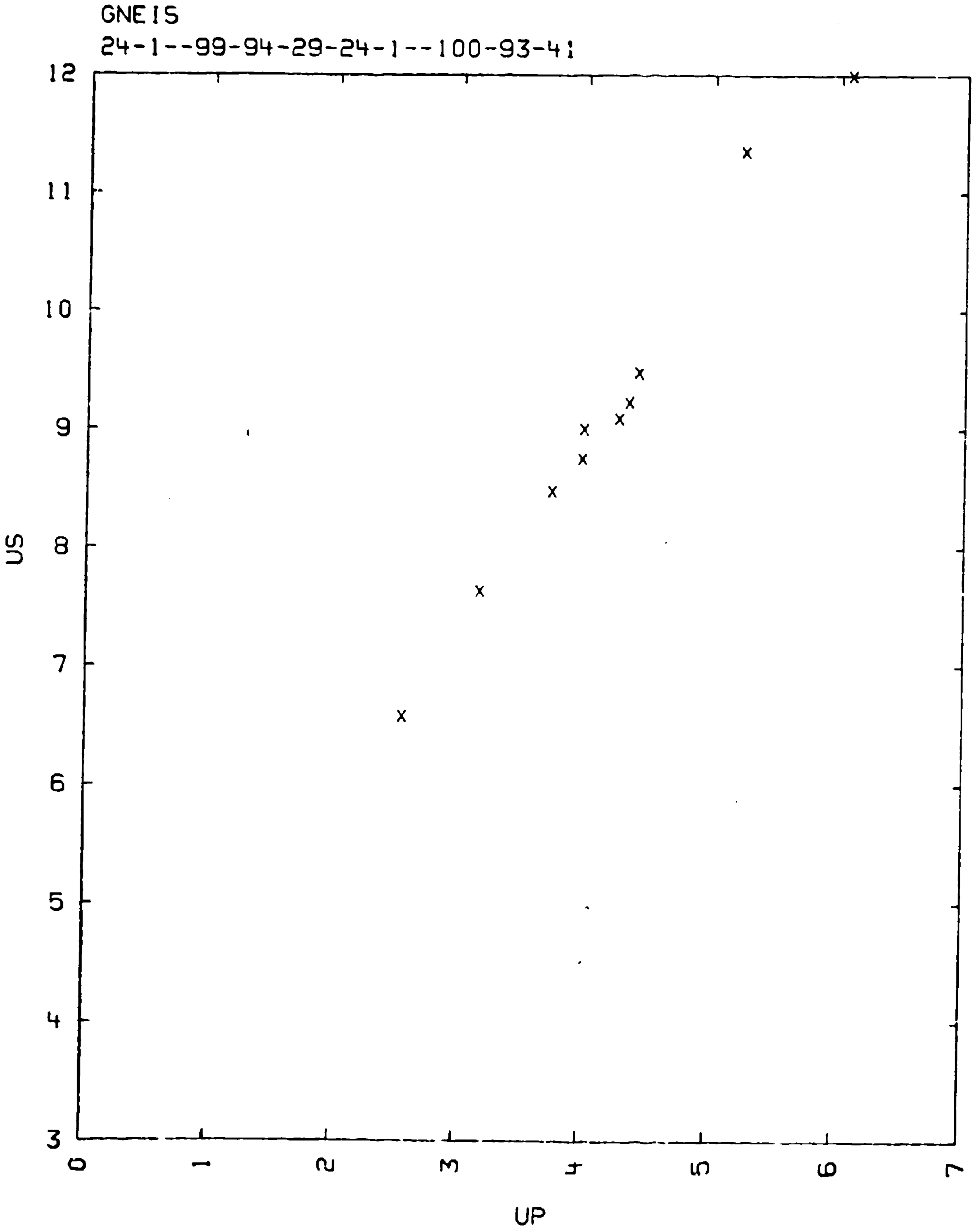
COMMENTS:

1) SOURCE: ISBELL W. M., SHIPMAN F. H. AND JONES A. H.
PROGRESS REPORT NO. 5, CONTRACT DA-49-146-X2-429
MATERIALS AND STRUCTURES LAB.
GENL. MOTORS TECHNICAL CENTER
WARREN, MICHIGAN 48090, U. S. A.

2) EXPERIMENTAL TECHNIQUE: A. THE PROTECTILE VELOCITIES WERE DETERMINED FROM TWO TIMED FLASH X-RAY SHADDOWGRAPHS.
STANDARDS: CU AND FANSTEEL

DATA REDUCTION TECHNIQUE: A.

TABLE I



24-23-2-1(100-321-608-200)--24-1---1
SILICONE RUBBER-SILICA MIXTURE

RUBBER STOCK	SI100-C321-H608-0200 :	68.4		WT.	PERCENT
SILICONE DIMETHYL	(-SI(C-H3)2-O-)X		96.8	MOL.	-
DIPHENYL	(-SI(C6-H5)2-O-)Y		2.0	-	-
VINYL-METHYL	(-(C-H3)SI(C2-H3)-O-)Z		1.2	-	-
CABOSYL	SI-O2	31.		WT.	-
DICUMYL PEROXIDE	((C6-H5)-C(C-H3)2-O-)2	0.6		-	-

V0 = 0.8203 CC/G

THE TABLE LISTS DENSITY IN G/CC., VELOCITIES IN KM/SEC AND PRESSURE IN KBAR. MET INDICATES DATA RECORDING METHOD.

TABLE

RHO0	US	UP	P	V/V0	MET
1.219	5.71	2.51	175.	0.56	A
-	5.76	2.44	172.	0.58	F
-	5.39	2.13	139.	0.60	F
-	4.58	1.72	96.	0.62	F
-	3.22	0.87	34.	0.73	F
-	3.20	0.92	35.	0.71	A

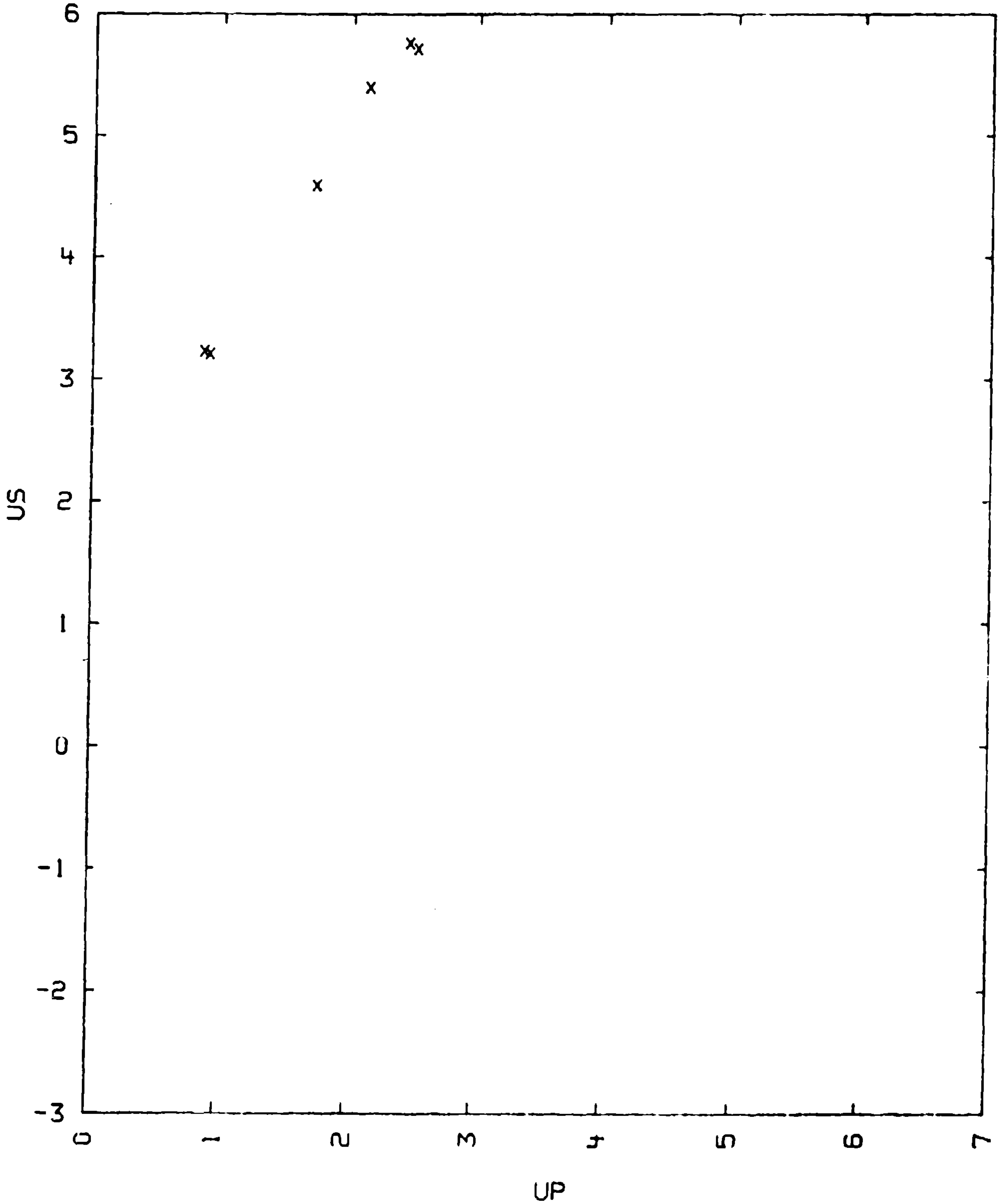
US = 1.78 + 1.62*UP KM/SEC
SIG.US = 0.11 KM/SEC.

COMMENTS:

1) SOURCE: MAY, R.P., BIESECKER, R.G. AND KING, T.N.
SANDIA LABORATORY REPORT SC-TM-68-187, MAY 1968
SANDIA CORP., ALBUQUERQUE, NEW MEXICO
2) EXPERIMENTAL TECHNIQUE: A AND F
DATA REDUCTION TECHNIQUE. B AND B* FOR EXP.METS. A AND F RESP.
3) THE RUBBER STOCK WAS SE5603 SILICONE RUBBER FROM GENERAL ELECTRIC CO. CURING AGENT WAS DICUMYL PEROXIDE FROM HERCULES POWDER CO. 0.6 PARTS OF CURING AGENT WERE MIXED WITH 100 PARTS BY WT. OF RUBBER STOCK TO TO MAKE THE ABOVE CURED MIXTURE. DUROMETER HARDNESS = 55 D.

TABLE I

SILICONE RUBBER-SILICA MIXTURE
24-23-2-1(100-321-608-200)--24



24-23-2-1--58-24-1--24-1--33-1---1
SILASTIC RUBBER, RTV- 521

DIMETHYLPOLYSILOXANE	((C-H3)-SI-O)N	56.1 WT PERCENT
DIATOMACIOUS EARTH	SI-O2	12.9 WT PERCENT
ZINC OXIDE	ZN-O	8.2 WT PERCENT
ZIRCONIUMSILICATE	ZR-SI-O4	21.6 WT PERCENT
OXIDES	M-O	1.1 WT PERCENT
DIBUTYLTINDILAURATE	H9-C4-SN-O2-C(C-H2)10-C-H3	0.1 WT PERCENT

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
1.370	3.69	1.40	71.	0.6206	2024 AL	6.55
1.380	4.17	1.77	102.	0.5755	2024 AL	6.91
1.380	5.48	2.37	179.	0.5675	2024 AL	7.56
1.370	7.03	3.50	337.	0.5021	2024 AL	8.74
1.370	7.46	3.73	381.	0.5000	2024 AL	9.00
1.360	7.42	3.78	381.	0.4906	2024 AL	9.03
1.380	7.54	3.88	404.	0.4854	2024 AL	9.16
1.370	8.31	4.56	519.	0.4513	2024 AL	9.86
1.370	8.10	4.66	517.	0.4247	2024 AL	9.93

US = 0.218 + 2.694*UP - 0.208*UP**2 KM/SEC
SIG US = 0.12 KM/SEC

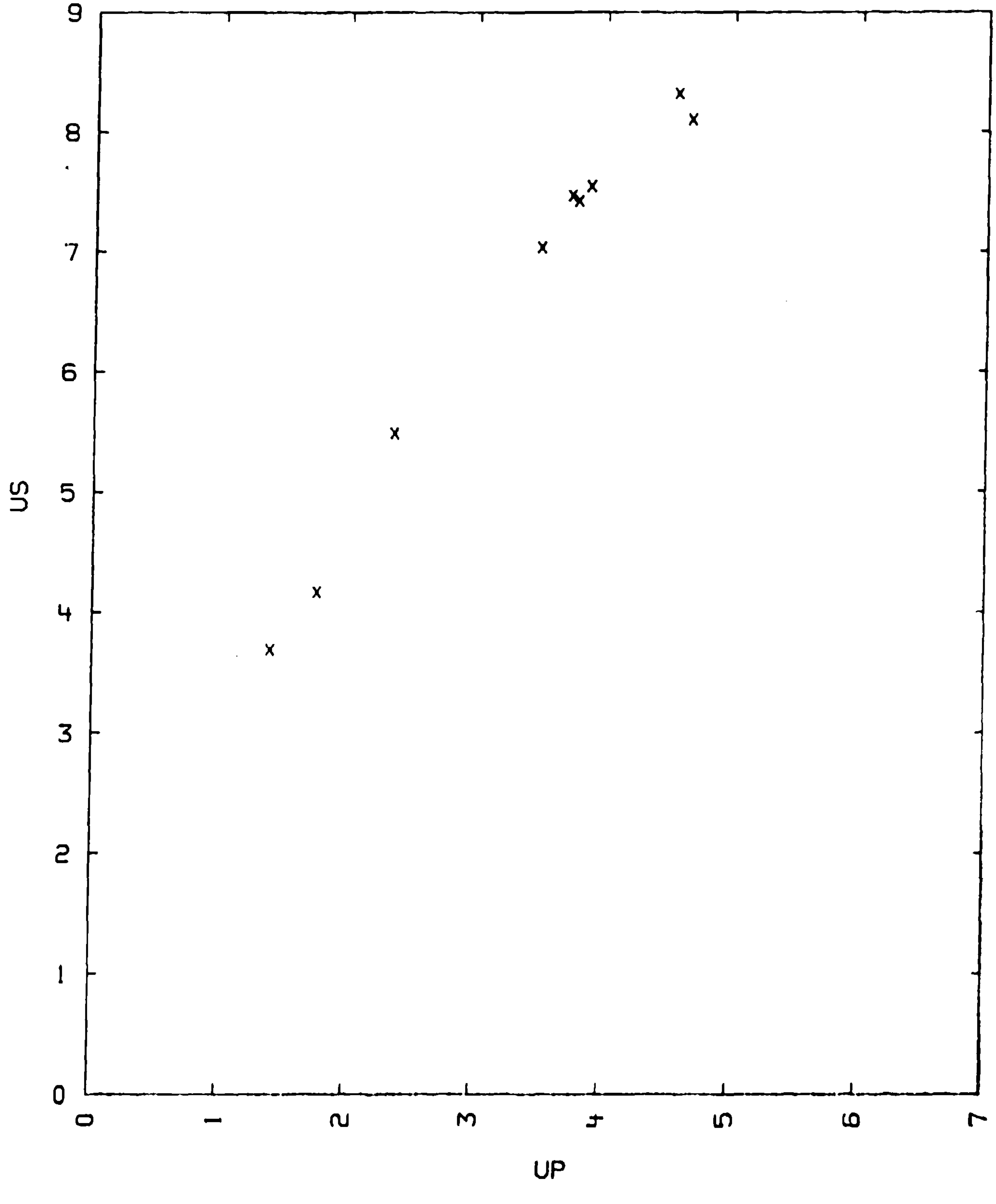
COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES,
HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B (STANDARD BASE PLATE AS SHOWN)
3) CHEMICAL ANALYSIS OF A RTV-521 SAMPLE IS CONSISTENT WITH THE ABOVE NOMINAL COMPOSITION
PRIVATE COMMUNICATION, PHILLIP G. FLEMING
LAWRENCE LIVERMORE LABORATORY, LIVERMORE, CALIFORNIA 94553

TABLE I

SILASTIC RUBBER, RTV- 521

24-23-2-1--58-24-1--24-1--33-1



27--23-18-2-1(100-1-110-20)---1
LEAD EPON (EPON-LEAD)

EPON C100-H113-O20-N 15.0 PERCENT BY WEIGHT
PB 85.0 PERCENT BY WEIGHT

VO = 0.206 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS.

TABLE

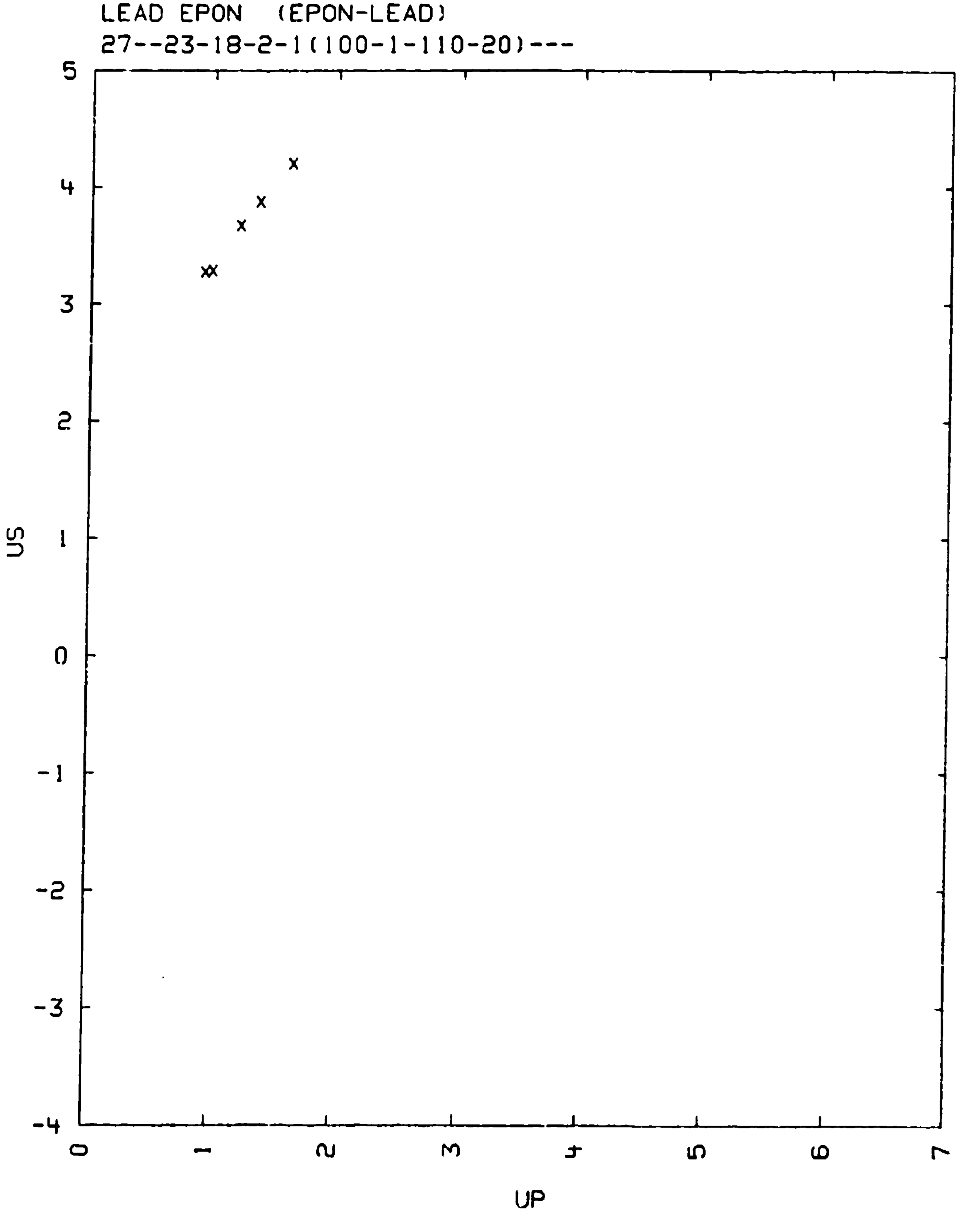
SAMPLE						BASE PLATE
RHOO	US	UFS	UP	P	V/VO	P
4.846	4.20	3.35	1.64	334	0.610	339
4.863	3.27	1.81	0.93	148	0.716	159
4.868	3.66	2.44	1.22	217	0.667	228
4.866	3.87	2.80	1.38	260	0.643	268
4.869	3.28	1.94	0.99	158	0.698	171

US = 1.98 +1.36 UP KM/SEC FOR UP BETWEEN 0.9 AND 1.6 KM/SEC
SIGMA US = 0.034 KM/SEC

COMMENTS:

1) SOURCE: COMPILER
L.R.L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
2) EXPERIMENTAL TECHNIQUE B. (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) THE EPON USED IN THIS MIXTURE WAS A LIQUID CONDENSATION PRODUCT OF BISPHENOL-A AND EPICHLOROHYDRIN ACTIVATED TO SOLIDIFY WITH PIPERIDINE TO GIVE THE ABOVE NOMINAL ATOMIC COMPOSITION.
4) A TYPICAL EPON-PIPERIDINE MIXTURE ANALYSIS:
C 74.14 PERCENT BY WEIGHT
H 7.39 -
O 17.69 -
N 0.78 -

TABLE I


LEAD EPON (EPON-LEAD)
27--23-18-2-1(100-1-110-20)---
US
UP
5
4
3
2
1
0
-1
-2
-3
-4
0
1
2
3
4
5
6
7

27--34--93---1
LEAD ALLOY

PB-CD-MG-ZN

PB 35 PERCENT BY WEIGHT
CD 33 PERCENT -
MG 30 PERCENT -
ZN 2 PERCENT -

VO = 0.231 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN CC/G, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS.

TABLE

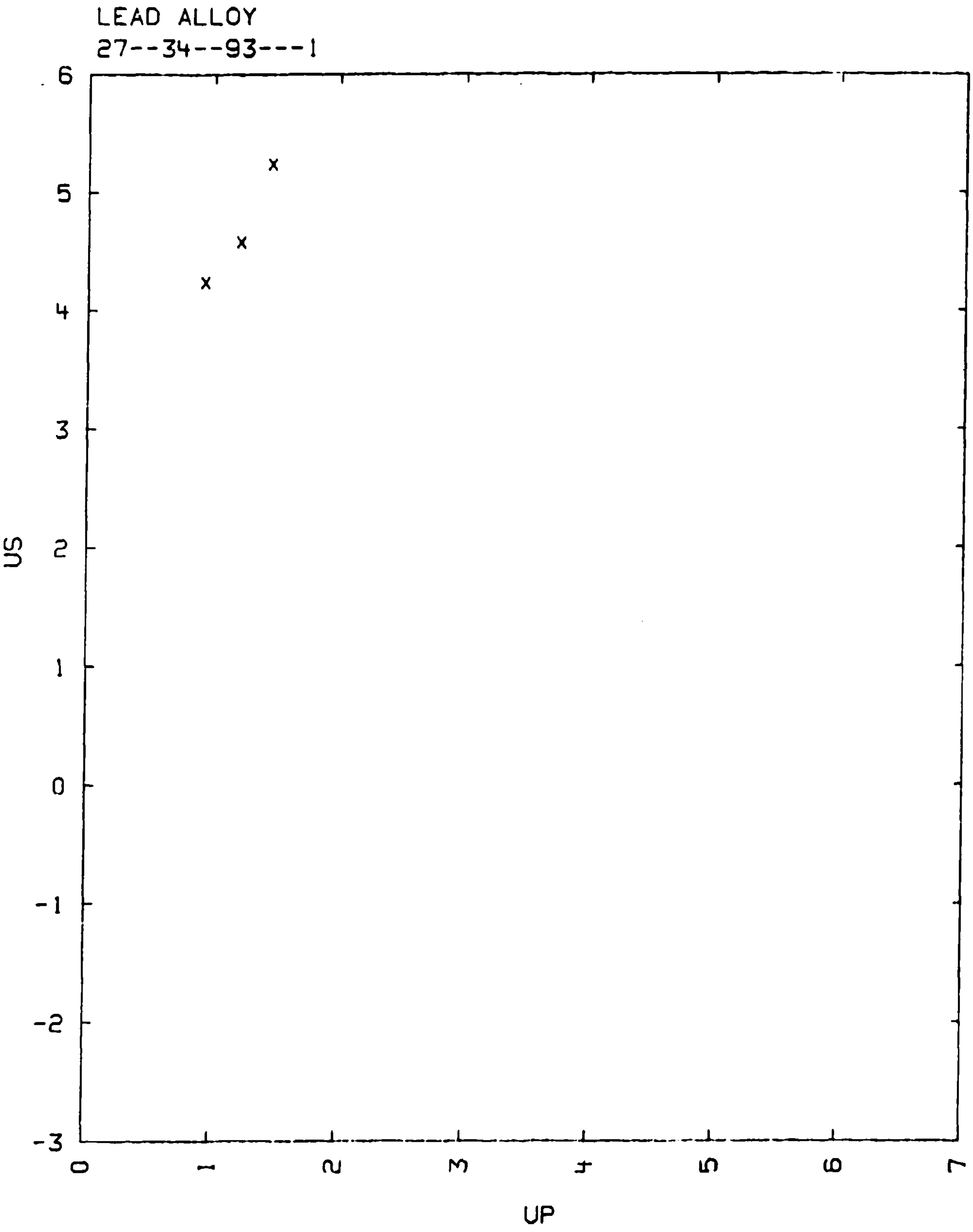
SAMPLE						BASE PLATE
RHOO	US	UFS	UP	P	V/VO	P
4.301	4.23	1.81	0.94	171	0.778	172
4.318	4.57	2.41	1.22	241	0.732	240
4.343	5.23	2.94	1.47	333	0.719	317

US = 2.41 + 1.87 UP KM/SEC
SIGMA US = 0.154 KM/SEC

COMMENTS:

1) SOURCE: COMPILER
L.R.L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
2) EXPERIMENTAL TECHNIQUE B. (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) SOME OF THE VARIATION IN RHOO MAY BE DUE TO A LACK OF UNIFORMITY IN THE ORIGINAL BATCH FROM WHICH THE SAMPLES WERE DERIVED.
THE ABOVE COMPOSITION OF THE ALLOY IS THE AVERAGE BATCH COMPOSITION.
4) THIS ALLOY IS PROBABLY A TWO PHASE SYSTEM:
A) A SOLUTION OF CD AND ZN IN MG
B) A MG2-PB PHASE (F. FULTON, METALLURGY L.R.L.)

TABLE 1



33-10--2-1---1
ZINC CHLORIDE AQUEOUS

ZN-CL2 66.5 WT PERCENT
H2-O REST

VO = 0.532 CC/G

CO = 1.538 +OR- 0.004 KM/SEC

IN THE TABLE BELOW, TEMPERATURE (TO) IS GIVEN IN DEGREES CENTIGRADE, DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

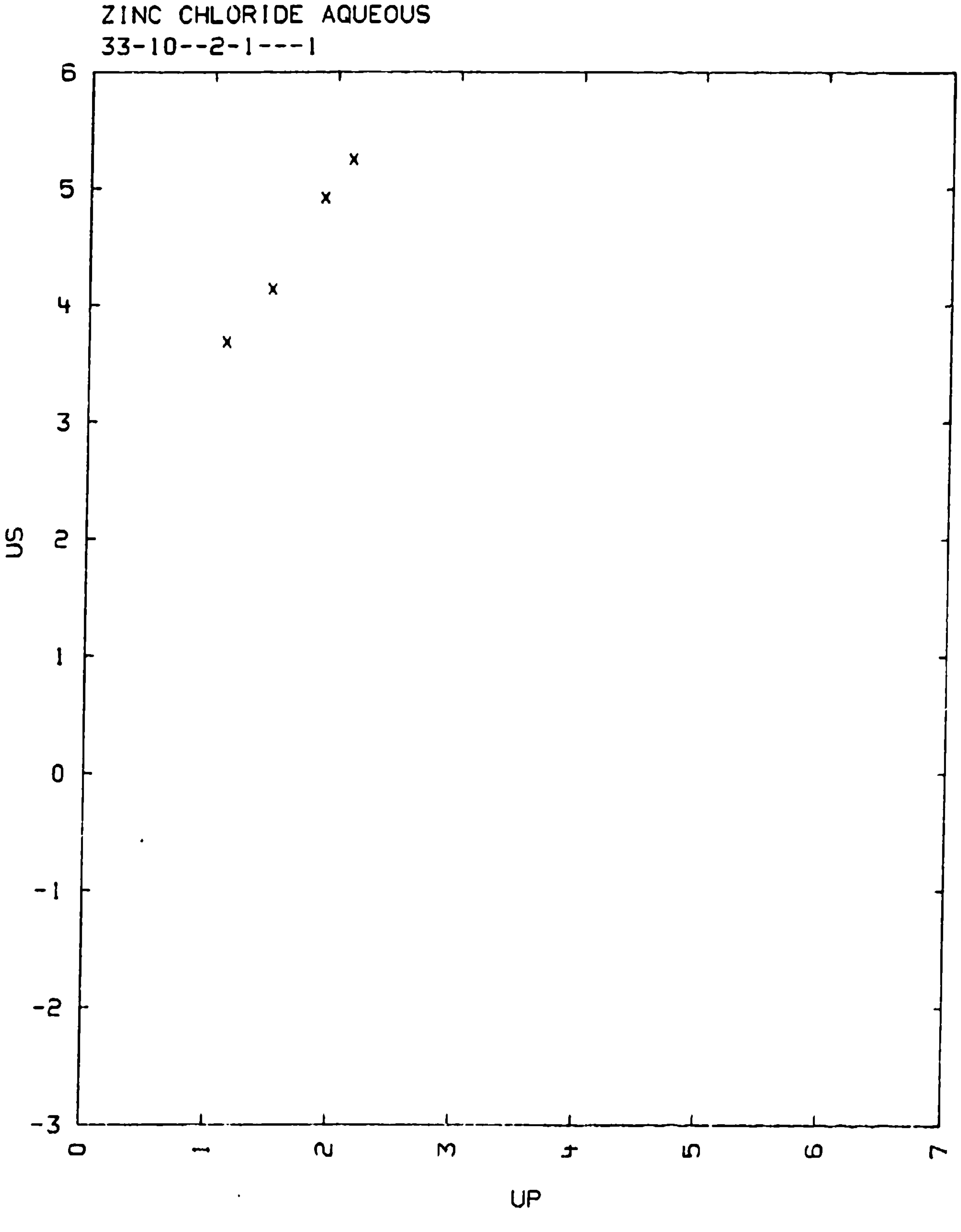
TO	RHOO	US	UP	P	V/VO
25	1.88	3.68	1.12	75	0.696
25	1.88	4.13	1.49	115	0.639
25	1.88	4.91	1.91	176	0.611
25	1.88	5.24	2.13	212	0.594

US = 1.858 + 1.583*UP KM/SEC , SIGMA US = 0.007 KM/SEC

COMMENTS:

1) SOURCE: RAMSAY, J. B.
PRIVATE COMMUNICATION (1966)
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL ALUMINUM 2024
3) THE ABOVE COMPOSITION WAS CALCULATED FROM THE MEASURED DENSITY AND THE DATA IN INTERNATIONAL CRITICAL TABLES, VOL. 3, (MCGRAW-HILL BOOK CO., NEW YORK, N. Y., 1929) P. 64.
4) CO IS A MEASURED VALUE GIVEN BY THE SOURCE.

TABLE I



36--33---1
BRASS

CU 60.56 PER CENT
ZN 39.31 PER CENT
MISC. 0.13 PER CENT

VO = 0.1189 G/CC.

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN MM/MICROSEC.
PRESSURE IN KILOBARS, AND DENSITY IN G/CC.

TABLE

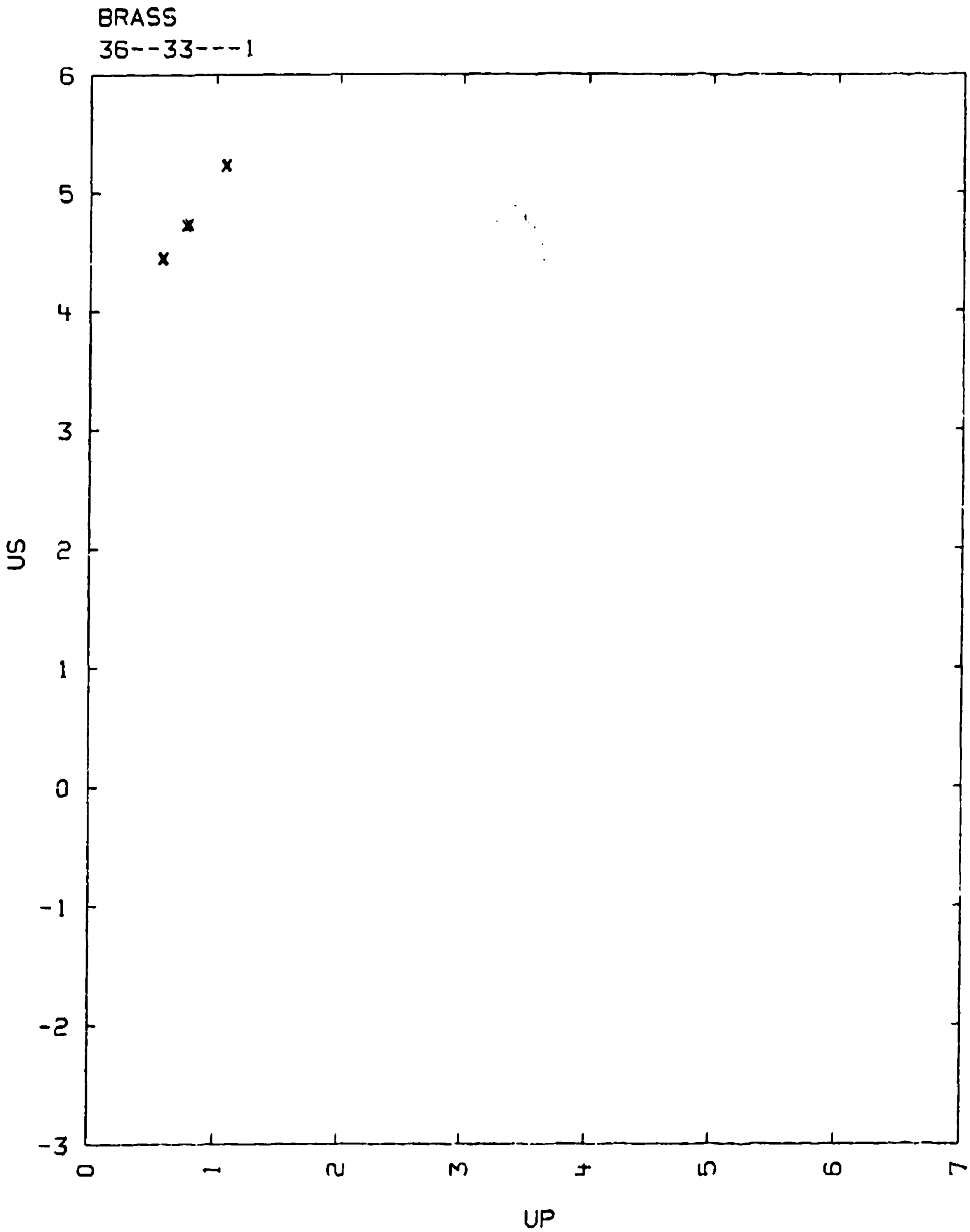
RHOO	US	UFS	UP	P	V/VO
8.413	4.446	1.181	0.590	220.7	0.8673
-	4.440	1.143	0.571	213.3	0.8714
-	4.731	1.553	0.791	314.8	0.8328
-	4.726	1.569	0.770	306.2	0.8371
-	5.236	2.200	1.085	478.0	0.7928
-	5.220		1.077	473.0	0.7937

US = 3.519 + 1.574 UP   SIGMA 0.4 PERCENT

COMMENTS:

1) SOURCE: WALSH, J. M., RICE, M. H., MCQUEEN, R. G. AND YARGER, F. L.
PHYS. REV., VOL. 108, P. 169 FF. (1957)
LOS ALAMOS SCIENTIFIC LABORATORY, GMX-6, LOS ALAMOS, N. MEX.
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL 24ST ALUMINUM
3) THE PROBABLE ERROR PER DATA POINT IS 0.7 PER CENT IN SHOCK VELOCITY FOR A GIVEN FREE SURFACE VELOCITY AND APPROXIMATELY 1 PERCENT IN COMPRESSION AT A GIVEN PRESSURE.
4) THE COMPOSITION WAS DETERMINED BY SPECTROCHEMICAL ANALYSIS

TABLE I



36--33---2
BRASS

CU 61.5 PERCENT
ZN 36.0 PERCENT
PB 2.5 PERCENT
FE 0.05 PERCENT OR GREATER

V0 = 0.1183 CC/G.

IN THE TABLE BELOW, VELOCITIES ARE GIVEN MM/MICROSEC., PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

RHO0	UFS	US	UP	P	V/V0
8.45	0.90	4.38	0.45	167	0.897
-	0.90	4.41	0.45	168	0.898
-	1.01	4.50	0.50	192	0.888
-	1.00	4.51	0.50	191	0.889
-	1.12	4.54	0.56	214	0.877
-	1.19	4.56	0.59	229	0.869
-	1.40	4.77	0.70	282	0.853
-	1.41	4.79	0.70	284	0.853
-	1.82	5.10	0.91	391	0.822
-	1.80	5.14	0.90	389	0.826
-	1.92	5.15	0.96	415	0.814
-	1.82	5.15	0.91	394	0.824
-	1.89	5.17	0.94	411	0.818
-	1.89	5.19	0.94	412	0.819
	3.50	6.22	1.72	906	0.723
-	3.63	6.29	1.78	947	0.717
-	3.72	6.39	1.82	985	0.715
-	4.07	6.59	1.99	1108	0.698
-	4.61	6.92	2.24	1308	0.677
-	4.71	6.97	2.28	1342	0.673
-	4.68	7.04	2.26	1348	0.679
-	4.74	7.05	2.29	1365	0.675
-	4.85	7.17	2.34	1420	0.674
-	5.57	7.54	2.66	1694	0.648
-	5.57	7.57	2.66	1702	0.649
-	5.64	7.77	2.69	1764	0.654

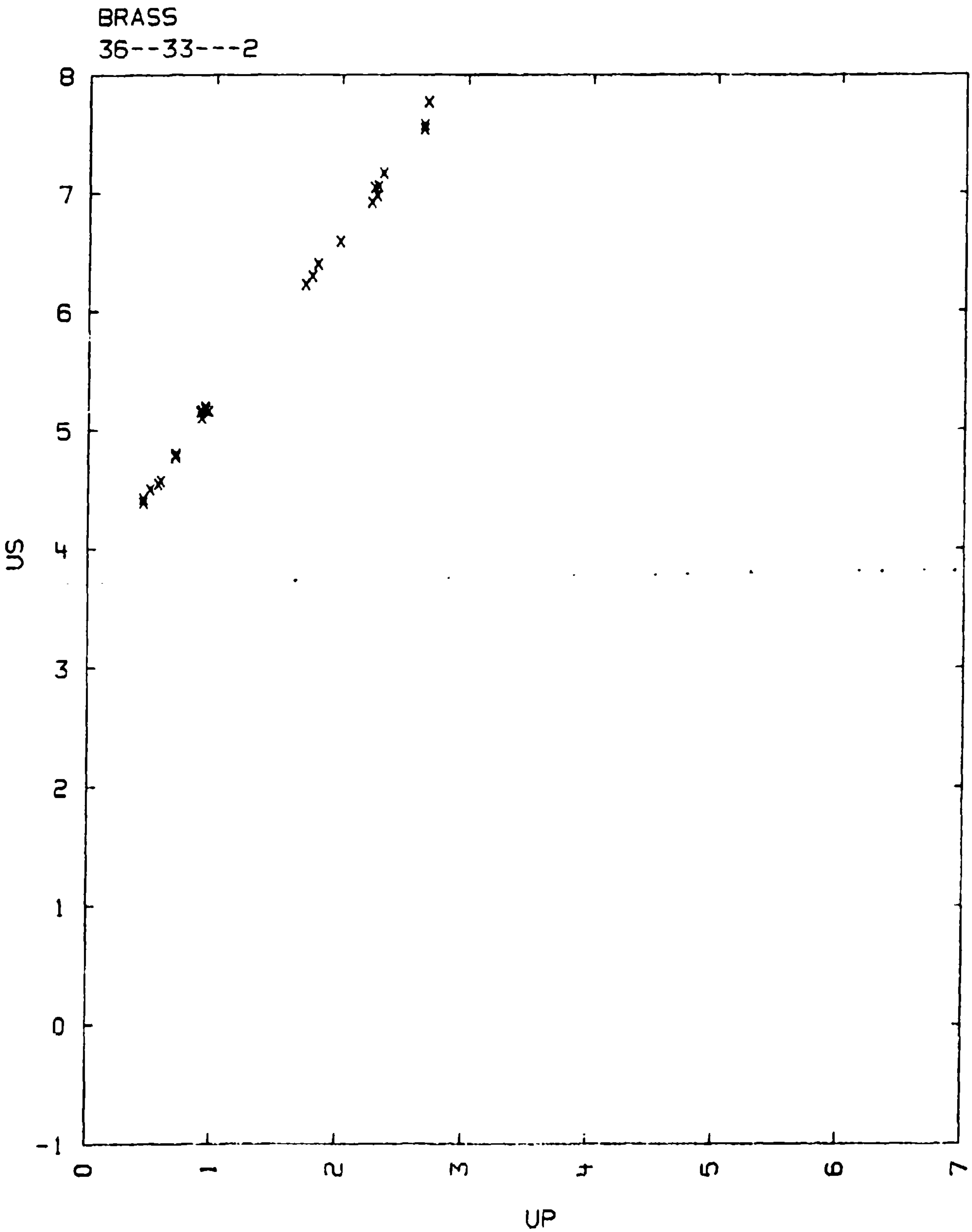
US = 3.781 + 1.431 * UP KM/SEC   SIGMA US = 0.051 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R. G., AND MARSH, S. P.
J. APPL. PHYS., VOL. 31, P. 1253 (1960)
LOS ALAMOS SCIENTIFIC LABORATORY, GMX-6, LOS ALAMOS, N. MEX.

2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE D

TABLE I



36--33---3
BRASS

SVENSKA METALLVERKEN ALLOY 1163
CU 63.0 PERCENT
ZN 36.6 PERCENT
PB 0.4 PERCENT

VO = 0.118 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS.

TABLE

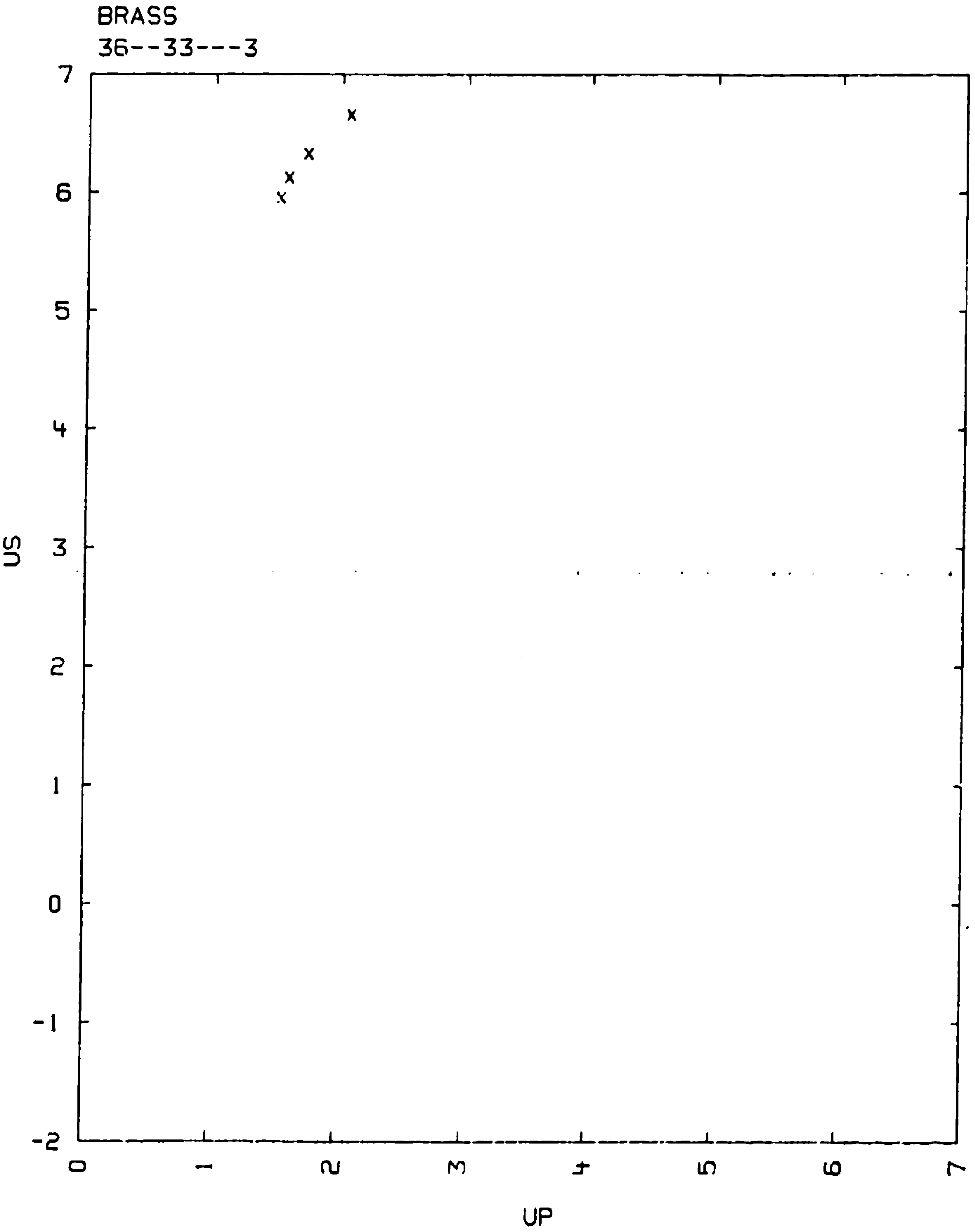
	SAMPLE					PROJECTILE
RHOO	US	UFS	UP	P	V/VO	VELOCITY
8.48	5.95	3.21	1.52	767	0.744	3.05
-	6.12	3.34	1.58	806	0.742	3.16
-	6.32		1.73	927	0.727	3.45
-	6.65		2.07	1168	0.689	4.14

US = 4.19 + 1.20 UP KM/SEC
SIGMA US = 0.066 KM/SEC

COMMENTS:

1) SOURCE: PERSSON, P. A., PERSSON, I.
FOA 2 REPORT A 2299-222, SEPT. 1964,
FORSVARTES FORSKNINGSANSTALT AVDELNING, SWEDEN.
UCRL TRANSLATION 1173(L).
2) EXPERIMENTAL TECHNIQUE B.
DATA REDUCTION TECHNIQUE B.
3) THE PARTICLE VELOCITY UP OF THE SAMPLE WAS TAKEN AS HALF THE PROJECTILE VELOCITY. (BRASS PROJECTILE WAS MOST LIKELY USED).
4) THE REPORTED RESULTS AGREE TO 1 PERCENT WITH DATA BY MCQEEN, R. G., AND MARSH, S. P., J. APPL. PHYS., VOL. 31, P. 1253 (1960).

TABLE I



36--33---4
BRASS

CU 61.5 PERCENT
ZN 36.0 -
PB 2.5 -
FE .05 - OR GREATER

V0 = 0.1183 CC/G

THE TABLE BELOW LISTS PRESSURE (P IN KILOBARS), PARTICLE- SHOCK- AND FREE SURFACE VELOCITY (UP, US AND UFS IN KM/SEC.) OF THE HUGONIOT. THIS HUGONIOT MAY BE CALCULATED FROM THE LINEAR FIT BELOW THE TABLE. THE OTHER COLUMNS ARE THE COEFFICIENTS OF THE FIT TO THE ISENTROPIC CURVES

P = A1*(UFS-U) + A2*(UFS-U)**2 + - - - A4(UFS-U)**4,

WHICH IN THE P VS U PLANE PASS THROUGH THE HUGONIOT AT THE LISTED POINTS THE DENSITY AT THE FOOT OF THE HUGONIOT IS 8.450 G/CC.

TABLE

RHO0	US	UP	UFS	P	A1	A2	A3	A4
8.453	3.9369	0.100	0.200	33.3	321.29	117.70	-0.24	1.17
-	5.0764	0.900	1.809	386.1	320.22	113.14	1.37	0.89
-	6.0736	1.600	3.246	821.1	318.61	99.24	5.80	0.18
-	6.7858	2.100	4.300	1204.1	316.34	86.85	8.80	-0.24
-	7.4981	2.600	5.435	1647.3	256.32	115.31	-4.25	1.40
-	8.0678	3.000	6.346	2045.2	235.36	113.08	-4.62	1.31

US = 3.79446 + 1.42446 UP KM/SEC.

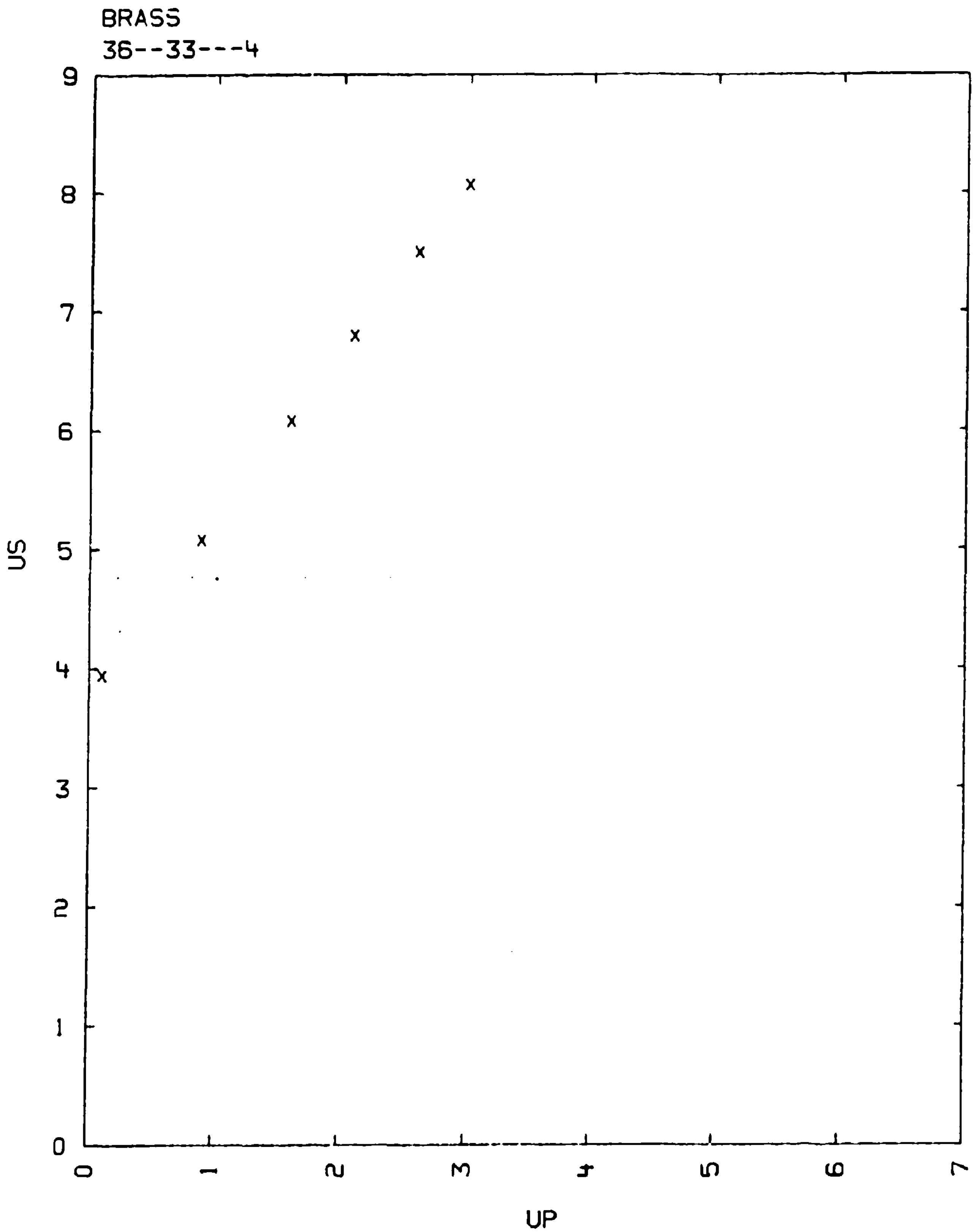
COMMENTS:

1) SOURCE: MARSH, S. P.
PRIVATE COMMUNICATION (1965)
GMX-6, LOS ALAMOS SCIENTIFIC LABORATORY
LOS ALAMOS, NEW MEXICO.
2) EXPERIMENTAL TECHNIQUE : NONE
DATA REDUCTION METHOD: D
THE ISENTROPES WERE CALCULATED WITH A CONSTANT VALUE OF 0.0518 CC/G FOR THE PARTIAL DERIVATIVE AT CONSTANT VOLUME (DE/DP). FURTHERMORE THE ABOVE HUGONIOT RELATION BETWEEN US AND UP WAS USED, CONSISTENT WITH BRASS DATA FROM THE SAME SOURCE
3) MAXIMUM ERRORS FOR THE ISENTROPE FITS TO THE ABOVE COMPUTER OUTPUT ARE AS FOLLOWS:
ENTRY 1:LESS THAN 0.1 KBAR OVER THE TOTAL PRESSURE RANGE
- 2: 0.6 KBAR BELOW- AND 0.04 KBAR ABOVE 80 KBAR
- 3: 2.1 KBAR BELOW- AND 0.3 KBAR ABOVE 120 KBAR
- 4: 2.9 KBAR BELOW- AND 0.6 KBAR ABOVE 160 KBAR
- 5:-9.2 KBAR BELOW- AND 0.3 KBAR ABOVE 170 KBAR
- 6:-9.2 KBAR BELOW- AND 0.2 KBAR ABOVE 220 KBAR

4) THE ERROR AT LOW PRESSURE OCCURS AT THE VOLUME OF THE 300 DEGREE KEL-
VIN SAMPLE. IT TAKES THE FORM OF A DISCONTINUITY IN THE SLOPE OF THE
CALCULATED ADIABAT. WHILE THE VALUE OF THE FREE SURFACE IS NOT AFFEC-
TED BY THIS PECULIARITY OF THE CODE OUTPUT, THE FRACTIONAL UNCERTANTY
IS LARGER BELOW THE PRESSURE LISTED IN COMMENT 3

5) THE MAXIMUM PRESSURE TO WHICH THE ABOVE FITS ARE VALID RANGE FROM
1800 KBARS FOR THE FIRST LINE TO 2300 KBARS FOR THE LAST TABLE ENTRY

TABLE I



39--57---1
TITANIUM-NICKEL ALLOY

NI 50.3 WT. PERCENT
TI 49.7 - -

V0 = 0.1548 CC/G
VCI = 0.1542 CC/G

C0 = 3.80 KM/SEC.

THE TABLE LISTS VELOCITY IN KM/SEC., PRESSURE IN KBAR., DENSITY IN G/CC. AND INITIAL TEMPERATURE IN DEG. CENTIGRADE.

TABLE

TO	RHOO	US	UP	P	V/VO
15	6.46	4.54	0.268	78.5	0.941
-	-	4.92	0.413	131.	0.916
-	-	5.19	0.490	164.	0.906
-	-	5.48	0.580	205.	0.894
-	-	5.55	0.665	238.	0.880
-	-	5.68	0.637	233.	0.888
-	-	5.83	0.725	273.	0.876
-	-	5.88	0.730	277.	0.876
-	-	6.05	0.720	281.	0.881
-	-	6.15	1.07	425.	0.826
-	-	6.45	1.14	475.	0.823
-	-	6.52	1.21	510.	0.814
-	-	7.01	1.38	625.	0.803
-	-	7.65	1.42	702.	0.814
-	-	7.72	1.54	768.	0.801
115	6.46	4.81	0.328	102.	0.932
-	-	5.33	0.610	210.	0.880
-	-	5.53	0.718	256.	0.870
-	-	5.95	1.04	400.	0.825
-	-	6.15	1.14	453.	0.815
-	-	6.19	1.23	492.	0.801
-	-	6.61	1.32	564.	0.800

AT 15 DEG.
US = A + B*UP ; A=4.04 B=2.38 FOR UP LESS THAN 0.8 KM/SEC.
SIG.A = 0.09 KM/SEC. SIG.B = 0.16
A=2.27 B=3.62 FOR UP GREATER THAN 0.8 KM/SEC.
SIG.A = 0.38 KM/SEC SIG.B = 0.30

COMMENTS:

1) SOURCE: COLEBURN, N. L.
REPORT NOLTR 67-78 (1967)
EXPLOSION DYN. DIV., EXPL. RES. DEP.
US NAVAL ORDNANCE LAB., WHITE OAK, MD, U.S.A.
2) EXPERIMENTAL TECHNIQUE: C1.
DATA REDUCTION TECHNIQUE: D1.

3) THE ALLOY WAS PREPARED BY ARC CASTING THE MIXTURE AND SWAGING AT 925 DEG. CENTIGRADE. 30 MINUTES ANNEALING AT 950 DEG., PRECEDED FINAL COOLING.

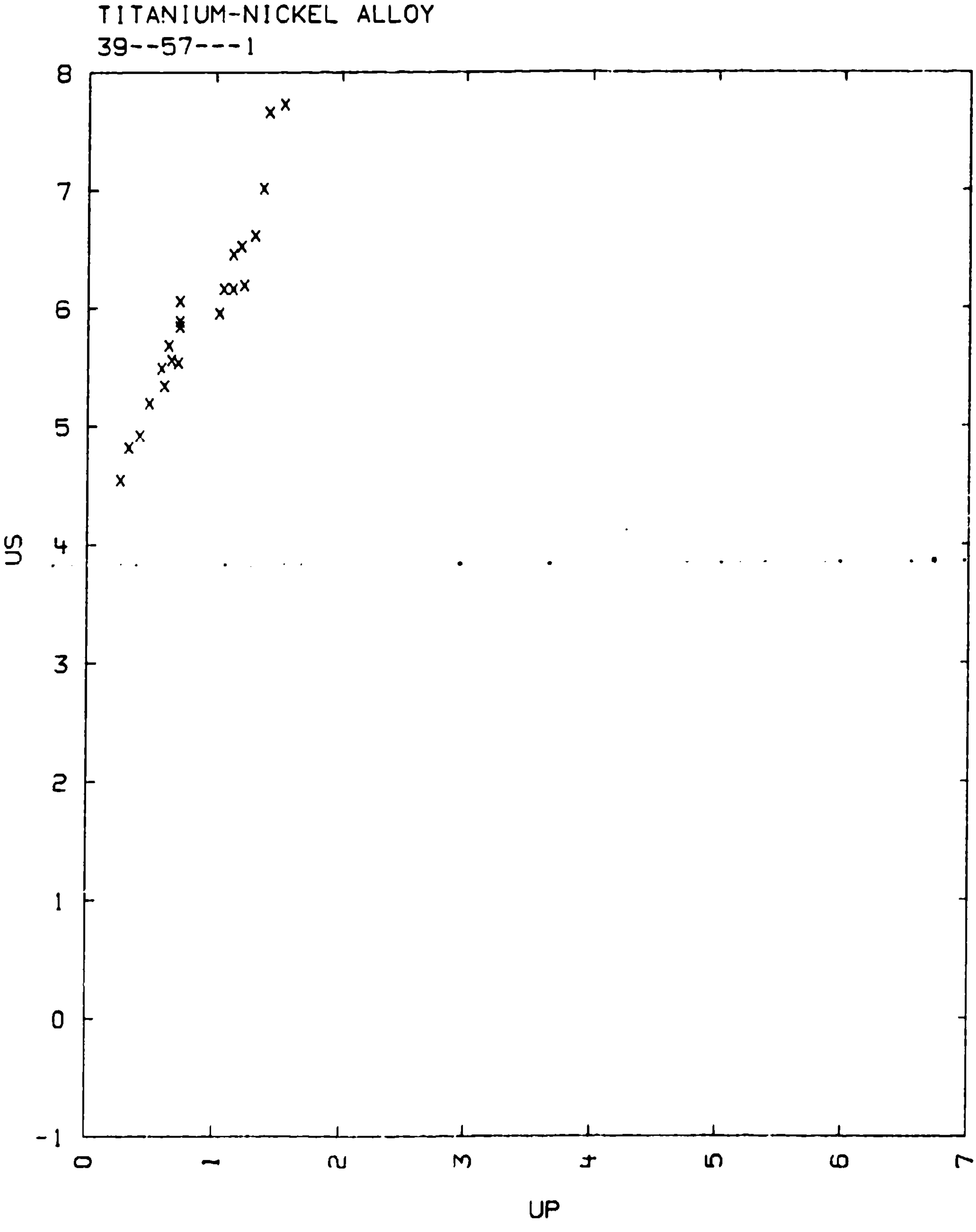
4) KNOOP HARDNESS OF SHOCK COMPRESSED AND RECOVERED SMAPLES:

PMAX	K
0	93
35	101
45	115
65	116
90	123
340	175

5) V0I WAS CALCULATED FROM A SMOOTH FIT OF THE CUBE ROOT OF THE ATOMIC VOLUME VERSUS ATOM PERCENT TI. POOLE AND HUME-ROTHERY LATTICE PARAMETERS AS LISTED BY PEARSON, METAL PHYSICS AND PHYSICAL METALLURGY (PERGAMON PRESS, NEW-YORK, 1958), WERE USED.

6) THE TWO SEGMENTS OF THE US.UP LINE OF THIS MATERIAL WERE SUGGESTED BY THE AUTHORS TO BELONG TO THE TWO PHASES OF A MARTENSITIC TRANSFORMATION.

TABLE I



39--57---2
TITANIUM-NICKEL ALLOY

NI 51.4 WT. PERCENT
TI 48.6 - -

VO = 0.1536
VOI= 0.1528

THE TABLE LISTS VELOCITY IN KM/SEC., PRESSURE IN KBAR., DENSITY IN G/CC. AND INITIAL TEMPERATURE IN DEG. CENTIGRADE.

TABLE

TO	RHOO	US	UP	P	V/VO
15	6.51	4.73	0.279	85.9	0.941
-	-	5.01	0.400	130.	0.920
-	-	5.08	0.495	164.	0.903
-	-	5.56	0.673	244.	0.879
-	-	5.64	0.664	244.	0.882
-	-	5.70	0.735	273.	0.871
-	-	5.88	0.720	275.	0.878
-	-	5.89	0.725	278.	0.877
-	-	6.08	0.980	388.	0.839
-	-	6.46	1.20	505.	0.815
-	-	6.48	1.20	506.	0.815
-	-	7.46	1.48	714.	0.808
-	-	7.52	1.56	764.	0.792
115	6.51	4.97	0.328	106.	0.934
-	-	5.63	0.695	255.	0.877
-	-	6.01	1.05	411.	0.825
-	-	6.21	1.13	457.	0.818
-	-	6.65	1.29	558.	0.806

US = A + B*UP AT 15 DEG:
A = 4.00 B = 2.45 FOR UP LESS THAN 0.8 KM/SEC
SIG.A = 0.10 KM/SEC. SIG.B = 0.15 KM/SEC
A = 3.32 B = 2.75 FOR UP GREATER THAN 0.8 KM/SEC.
SIG.A = 0.22 KM/SEC. SIG.B = 0.17 KM/SEC

COMMENTS:

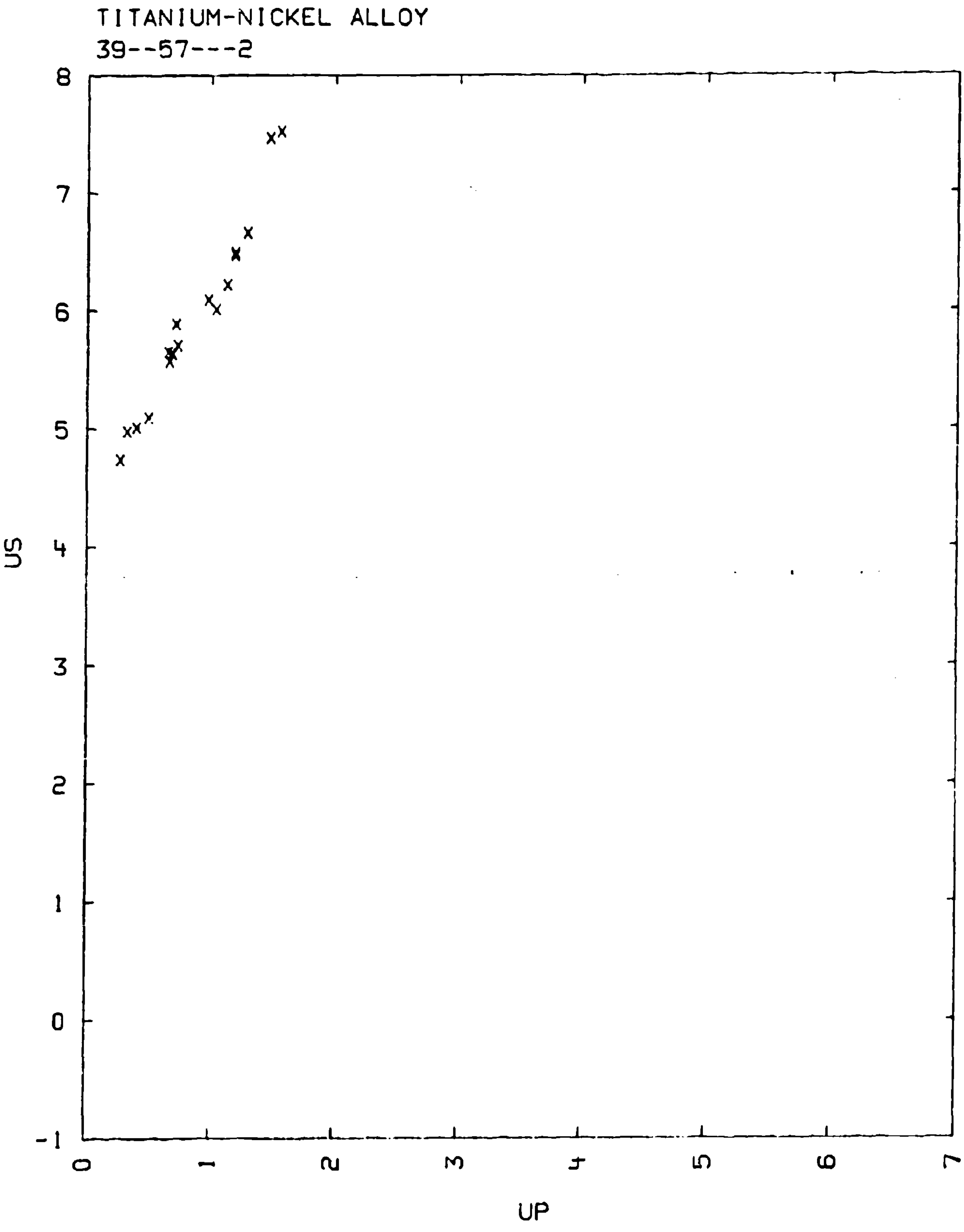
1) SOURCE: COLEBURN, N. L.
REPORT NOLTR 67-78 (1967)
EXPLOSION DYN. DIV., EXPL. RES. DEP.
US NAVAL ORDNANCE LAB., WHITE OAK, MD, U.S.A.
2) EXPERIMENTAL TECHNIQUE: C1.
DATA REDUCTION TECHNIQUE: D1.
3) THE ALLOY WAS PREPARED BY ARC CASTING THE MIXTURE AND SWAGING AT 925 DEG. CENTIGRADE. 30 MINUTES ANNEALING AT 950 DEG., PRECEDED FINAL COOLING.
4) KNOOP HARDNES OF SHOCK COMPRESSED AND RECOVERED SAMPLES

PMAX	K
0	157
35	178
45	185
65	193
90	205

5) V01 WAS CALCULATED FROM A SMOOTH FIT OF THE CUBE ROOT OF THE ATOMIC VOLUME VERSUS ATOM PERCENT TI. POOLE AND HUME-ROTHERY LATTICE PARAMETERS AS LISTED BY PEARSON, METAL PHYSICS AND PHYSICAL METALLURGY (PERGAMON PRESS, NEW-YORK, 1958), WERE USED.

6) THE TWO SEGMENTS OF THE US,UP LINE ARE PROBABLY RELATED TO THE TRANSFORMATION OBSERVED IN THE 50-50 COMPOSITION.

TABLE I



39--57---3
TITANIUM-NICKEL ALLOY

NI	55.0	WT. PERCENT
TI	45.0	WT. PERCENT

V0 = 0.1490 CC/G
V0I= 0.1488 CC/G

THE TABLE LISTS VELOCITY IN KM/SEC., PRESSURE IN KBAR., DENSITY IN G/CC. AND INITIAL TEMPERATURE IN DEG. CENTIGRADE.

TABLE

TO	RHOO	US	UP	P	V/VO
15	6.71	4.76	0.280	89.4	0.941
-	-	5.56	0.660	246.	0.881
-	-	5.67	0.669	256.	0.882
-	-	5.69	0.618	236.	0.891
-	-	5.78	0.705	273.	0.878
-	-	5.90	0.725	287.	0.877
-	-	6.48	1.17	509.	0.819
-	-	6.49	1.20	523.	0.815
-	-	6.74	1.41	638.	0.791
-	-	7.17	1.58	760.	0.780
-	-	4.61	0.320	99.0	0.931
-	-	5.37	0.625	225.	0.884
-	-	5.39	0.710	257.	0.868
-	-	6.00	1.03	415.	0.828
-	-	6.21	1.06	442.	0.829
-	-	6.53	1.15	504.	0.824

US = A + B*UP AT 15 DEG:
A = 4.08 KM/SEC   B = 2.42 FOR UP LESS THAN 0.8
SIG.A = 0.11 KM/SEC.   SIG.B= 0.16
A = 4.51 KM/SEC   B = 1.65 FOR UP GREATER THAN 0.8
SIG.A = 0.24 KM/SEC.   SIG.B = 0.18

COMMENTS:

1) SOURCE: COLEBURN, N. L.
REPORT NOLTR 67-78 (1967)
EXPLOSION DYN. DIV., EXPL. RES. DEP.
US NAVAL ORDNANCE LAB., WHITE OAK, MD, U.S.A.
2) EXPERIMENTAL TECHNIQUE: C1.
DATA REDUCTION TECHNIQUE: D1.
3) THE ALLOY WAS PREPARED BY ARC CASTING THE MIXTURE AND SWAGING AT 925 DEG. CENTIGRADE. 30 MINUTES ANNEALING AT 950 DEG., PRECEDED FINAL COOLING.
4) KNOOP HARDNES OF SHOCK COMPRESSED AND RECOVERED SAMPLES

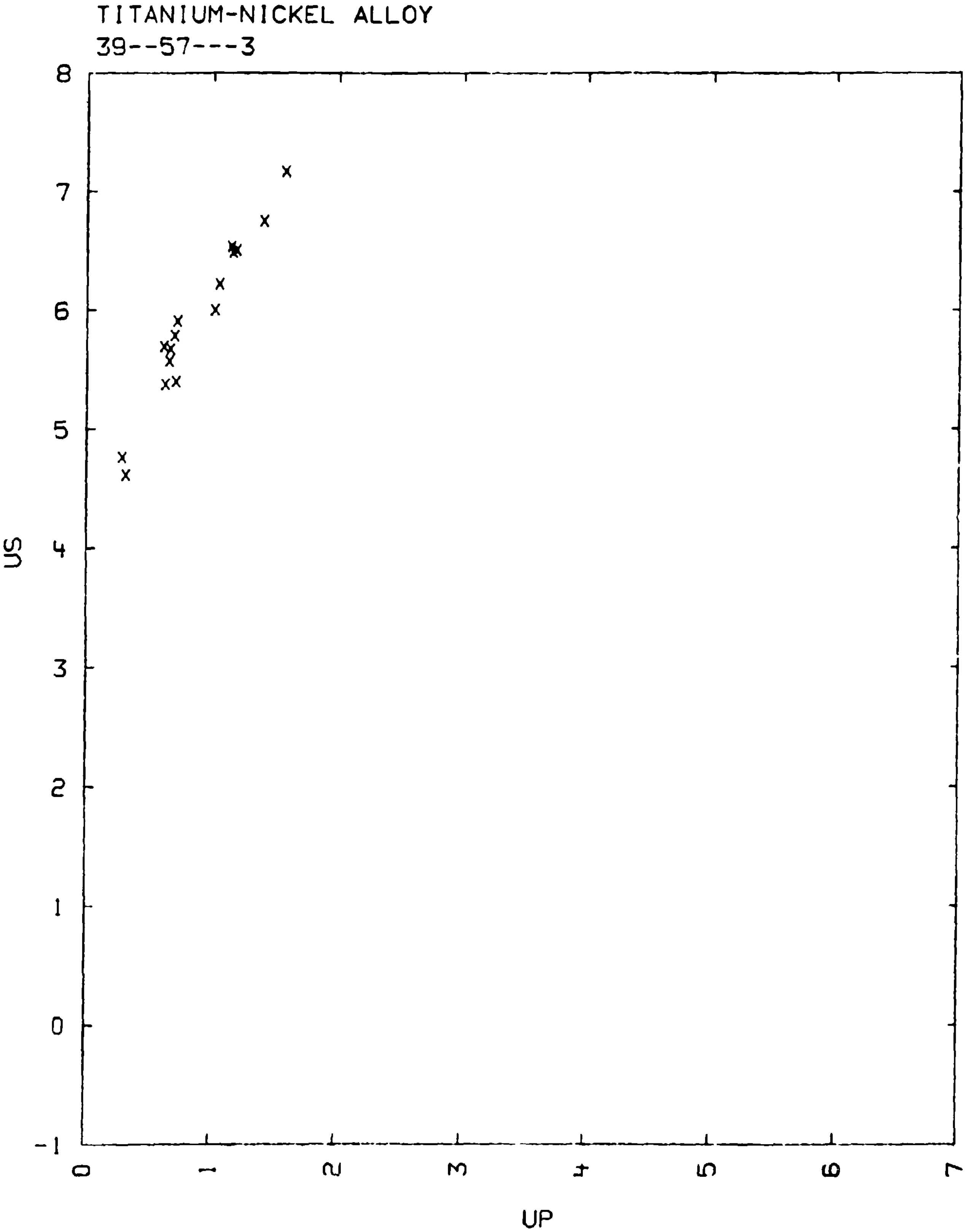
PMAX	K
0	168.

35	183.
90	225

5) VOI WAS CALCULATED FROM A SMOOTH FIT OF THE CUBE ROOT OF THE ATOMIC .OLUME VERSUS ATOM PERCENT TI. POOLE AND HUME-ROTHERY LATTICE PARAMETERS AS LISTED BY PEARSON, METAL PHYSICS AND PHYSICAL METALLURGY (PERGAMON PRESS, NEW-YORK, 1958), WERE USED.

6) THE TWO SEGMENTS OF THE US,UP LINE ARE PROBABLY RELATED TO THE TRANSFORMATION OBSERVED IN THE 50-50 COMPOSITION.

TABLE I



36-1--23-18-2-1(200-10-286-33)---1
COPPER OXIDE- EPOXY

COPPEROXIDE	CU-O	44 WT PERCENT
EPOXY	C200-N10-H286-033)	56 WT PERCENT
EPON 815	C200-H261-036,	90 WT PERCENT
DIETHYLENETRIAMINE,	H-N(-C(H2)-C(H2)-N-H2)2	10 WT PERCENT

VO = 0.566 - 0.606 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

----SAMPLE----					----STANDARD----	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
1.761	4.25	1.28	96.	0.6988	2024 AL	6.56
1.684	4.85	1.65	135.	0.6598	2024 AL	6.94
1.717	5.73	2.18	214.	0.6195	2024 AL	7.54
1.682	7.74	3.73	486.	0.5181	2024 AL	9.24
1.651	8.20	3.99	540.	0.5134	2024 AL	9.53
1.766	8.76	4.44	687.	0.4932	2024 AL	10.10

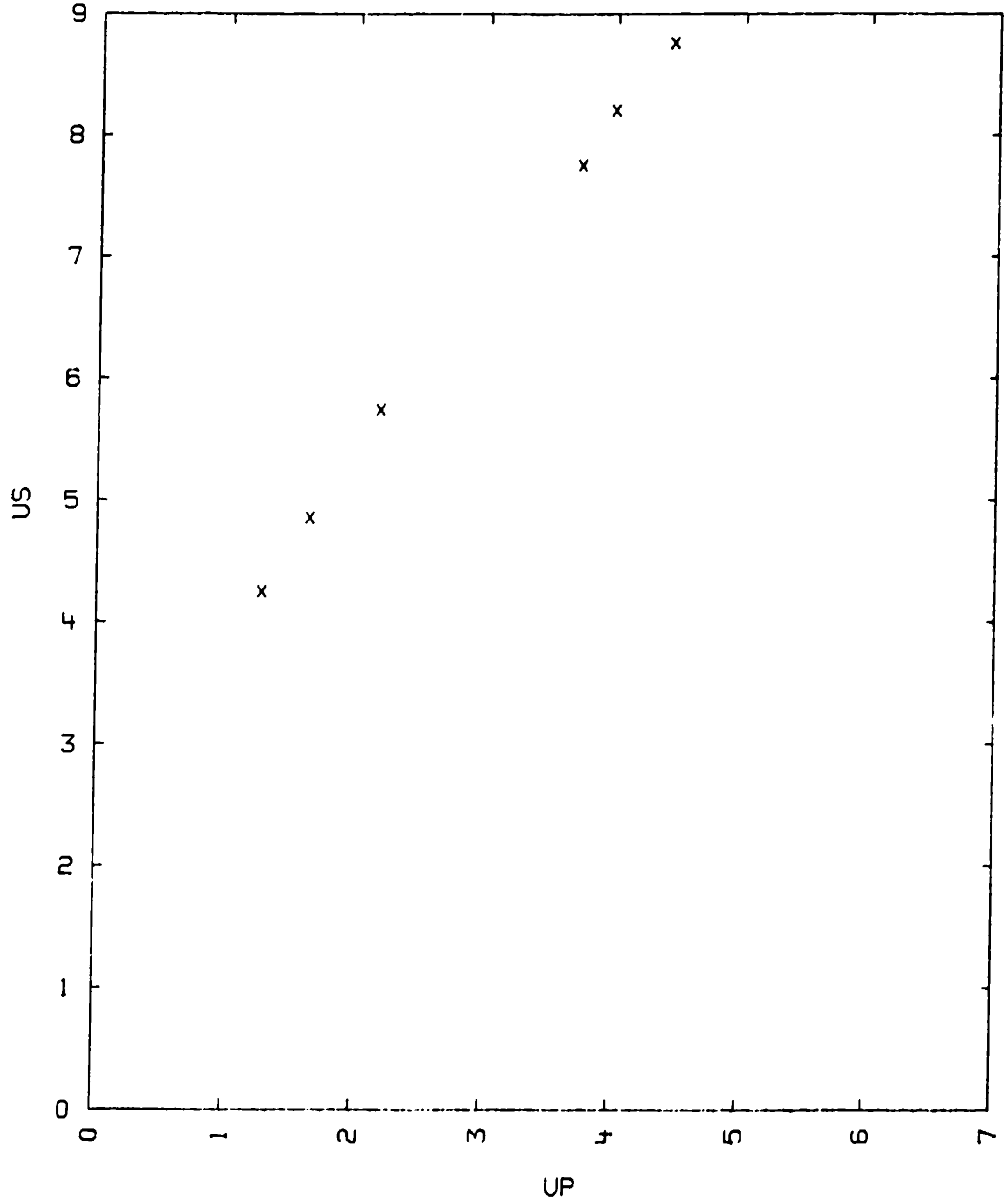
US = 2.110 + 1.767*UP - 0.062*UP **2 KM/SEC
SIG US = 0.071 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B
3) THE EPON 815 COMPOSITION WAS OBTAINED FROM P. FLEMING, PRIVATE COMMUNICATION. (L.L. LAB, LIVERMORE, CA 1975) ALSO SEE MODERN PLASTICS ENCYCLOPEDIA (MC GRAW HILL, N.Y., 1975) VOL. 51

TABLE I

COPPER OXIDE- EPOXY
36-1--23-18-2-1(200-10-286-33)



38--25---1
GOLD- GERMANIUM

AU 94.2 WT PERCENT NOTE 3
GE 5.8 WT PERCENT

V0 = 0.0591 - 0.0596 CC/G   CL = 3.326 KM/SEC   C0 = 2.95 KM/SEC
CS = 1.329 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

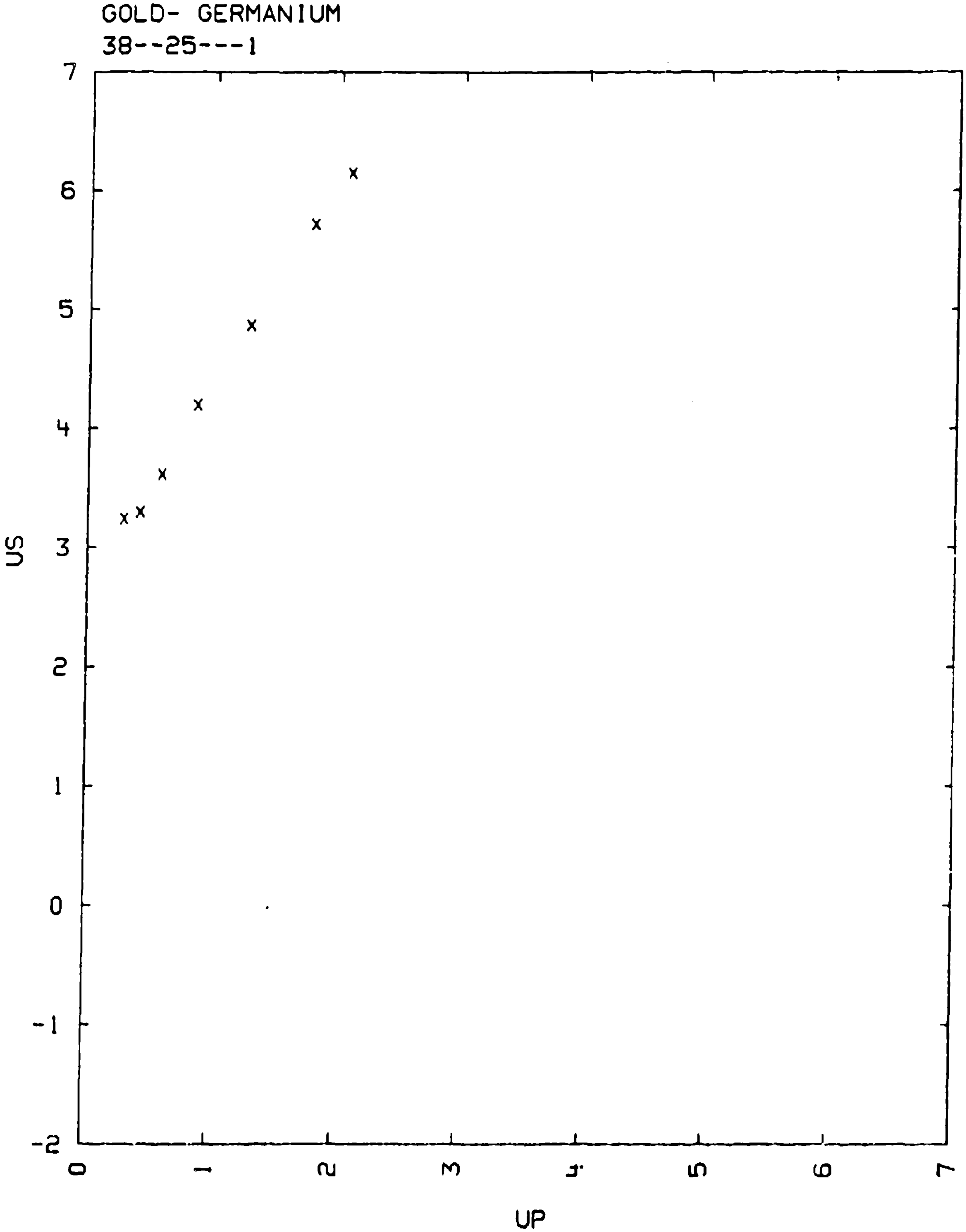
---SAMPLE---					---STANDARD---	
RHO0	US	UP	P	V/V0	MATERIAL	US(ST)
16.880	3.23	0.29	158.	0.9102	CU	4.45
16.820	3.29	0.42	232.	0.8723	CU	4.67
16.850	3.61	0.60	365.	0.8338	CU	4.98
16.880	4.19	0.88	622.	0.7900	CU	5.51
16.830	4.86	1.29	1055.	0.7346	CU	6.23
16.910	5.71	1.80	1738.	0.6848	CU	7.16
16.760	6.14	2.09	2151.	0.6596	CU	7.65

US = 2.430 + 2.099*UP - 0.155*UP**2 KM/SEC FOR UP ABOVE 0.4 KM/SEC
SIG US = 0.026 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B
3) THE COMPOSITION WAS CALCULATED FROM THE DENSITY, ASSUMING VOLUME ADDITIVITY.

TABLE I



38--25---2
GOLD- GERMANIUM

AU 90.7 WT PERCENT NOTE 3
GE 9.3 WT PERCENT

VO = 0.0643 - 0.0646 CC/G CL = 3.388 KM/SEC CO = 2.94 KM/SEC
CS = 1.465 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

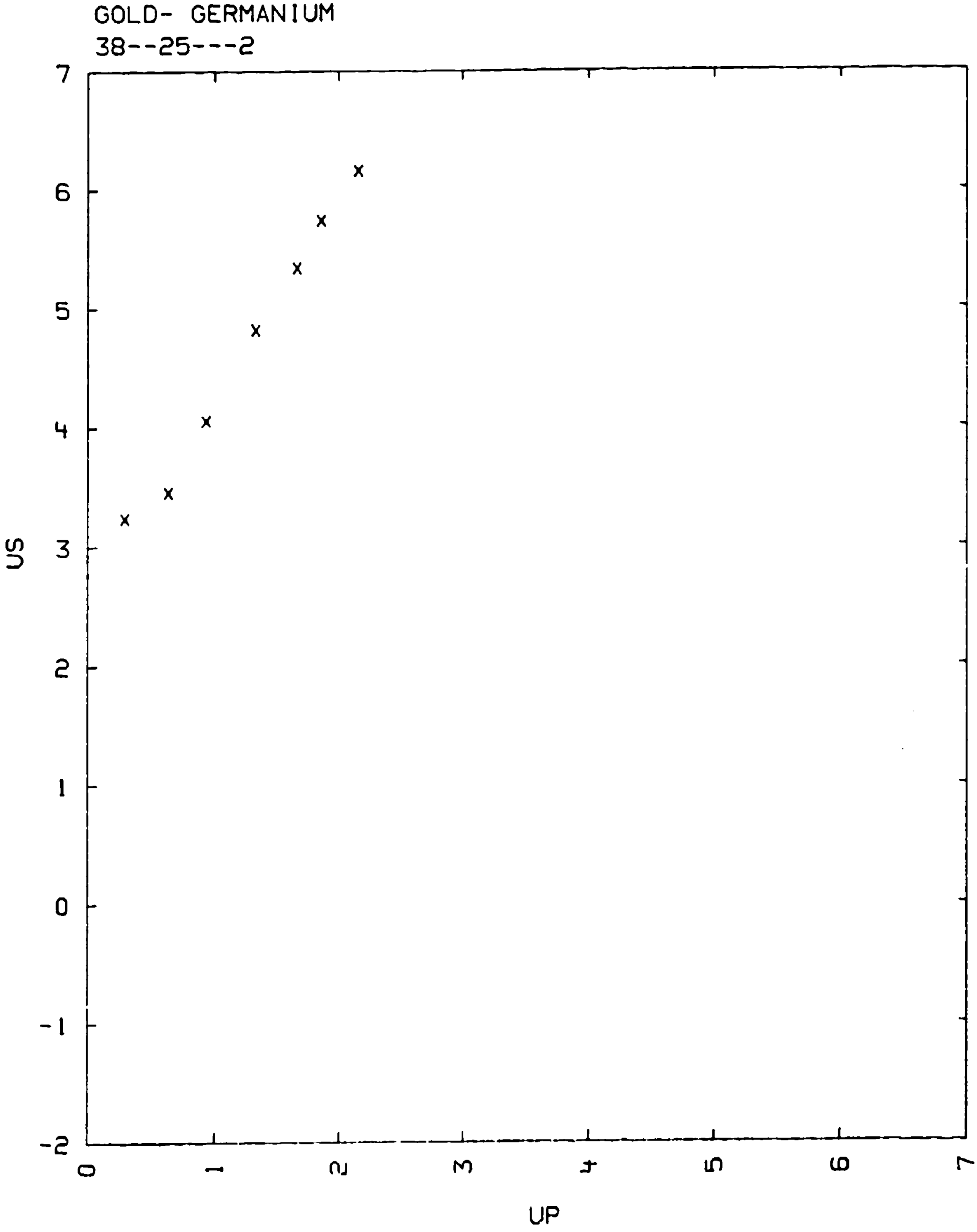
SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
15.460	3.23	0.30	150.	0.9071	CU	4.45
15.480	3.45	0.64	342.	0.8145	CU	4.98
15.510	4.05	0.94	590.	0.7679	CU	5.51
15.550	4.81	1.34	1002.	0.7214	CU	6.23
15.490	5.34	1.67	1381.	0.6873	CU	6.79
15.480	5.34	1.67	1380.	0.6873	CU	6.79
15.840	5.73	1.86	1688.	0.6754	CU	7.16
15.520	6.15	2.16	2062.	0.6488	CU	7.65

US = 2.090 + 2.235*UP - 0.163*UP**2 KM/SEC FOR UP ABOVE .5 KM/SEC
SIG.US = 0.032 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE : B
DATA REDUCTION TECHNIQUE : B
3) THE COMPOSITION WAS CALCULATED FROM THE DENSITY ASSUMING VOLUME ADDITIVITY OF THE COMPONENTS.

TABLE I



41--24---1
IRON-SILICON MIXTURE

FE 79.8 WT. PERCENT
SI 19.8 WT. PERCENT
W 0.3-0.4 WT. PERCENT

VO = 0.1425 CC/G
VOI= 0.1430 CC/G.

IN THE TABLE BELOW, THE DENSITY IS GIVEN IN G/CC, VELOCITIES ARE IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UP	P	V/VO
7.016	6.323	0.780	346.	0.877
-	6.588	1.047	484.	0.841
-	7.199	1.353	683.	0.812
-	7.354	1.448	747.	0.803
-	7.596	1.638	872.	0.784
-	7.651	1.856	996.	0.757
-	7.656	1.805	969.	0.764
-	7.732	1.832	994.	0.763
-	7.732	1.897	1029.	0.755
-	7.887	2.016	1116.	0.744
-	8.125	2.193	1250.	0.730
-	8.436	2.569	1521.	0.695
-	8.635	2.516	1524.	0.709
-	8.979	2.960	1865.	0.670
-	9.287	3.126	2037.	0.663
-	9.317	3.134	2048.	0.664
-	9.615	3.185	2148.	0.669
-	9.939	3.627	2529.	0.635

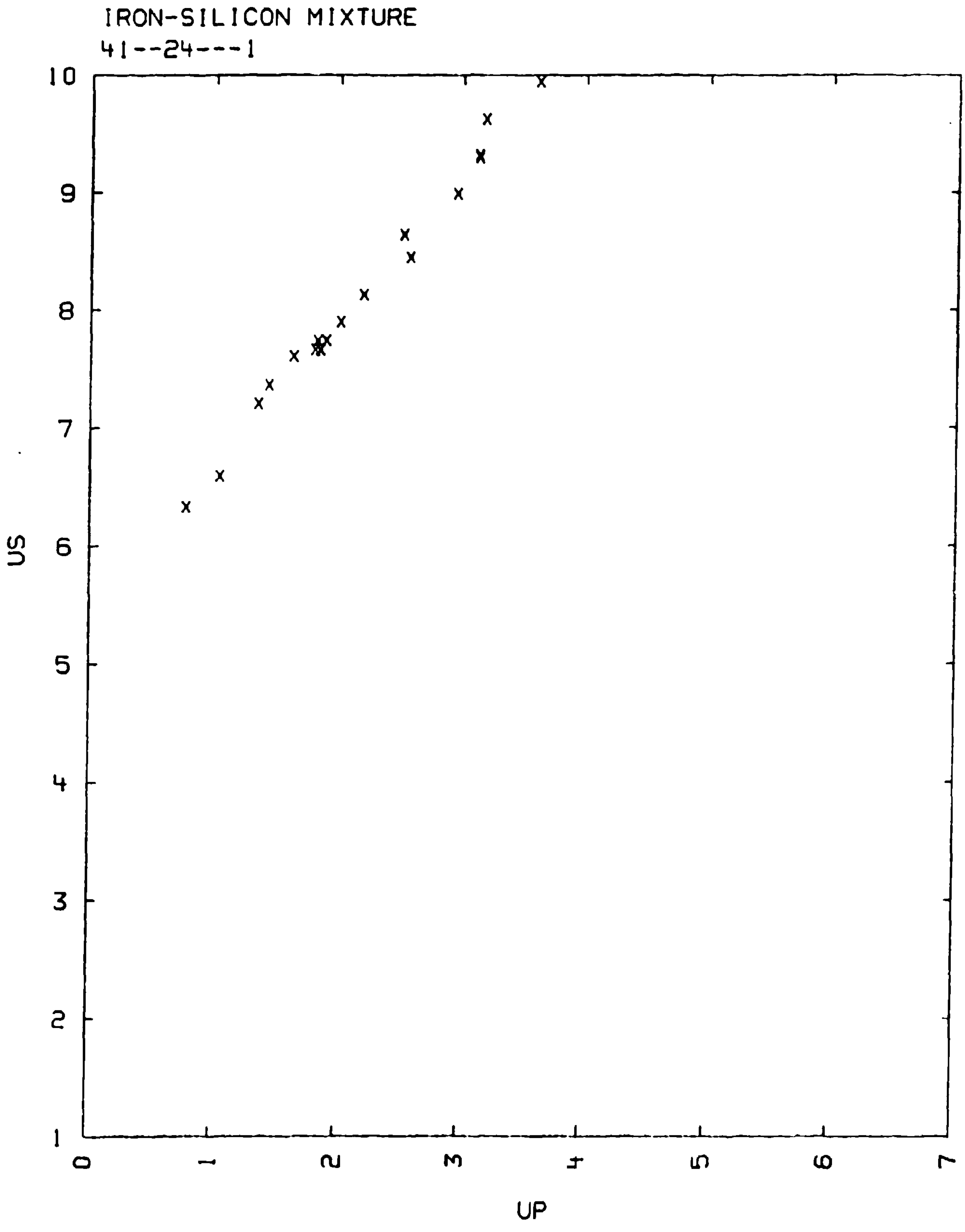
US = 5.444 + 1.235*UP KM/SEC. SIGMA US = 0.103 KM/SEC

COMMENTS:

1) SOURCE: BALCHAN, A. S. AND COWAN, G. R.
JOURNAL OF GEOPHYSICAL RESEARCH, VOL. 71, P. 3577, (1966)
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL IS NICKEL
3) THE STANDARD HUGONIOT WAS OBTAINED FROM THE FOLLOWING EQUATION:
US = 4.612 + 1.523*UP - 0.0148*UP**2 KM/SEC.
THIS EQUATION IS A COMPOSITE FIT OF DATA OBTAINED FROM WALSH, J. H., ET AL., MATERIAL 39---1, MCQUEEN, R. G. AND MARSH, S. P., MATERIAL 39---2 AND ALTSHULER, L. V., ET AL., MATERIAL 39---3.
4) THE INITIAL DENSITY (RHOO) IS A AVERAGE DENSITY.
5) A SHOCK TILT CORRECTION WAS APPLIED TO THE MEASURED SHOCK VELOCITIES FOR BOTH THE DRIVER PLATE AND SAMPLE.
6) SEE MATERIAL 41---15 FOR A DIFFERENT COMPOSITION

7) V01 WAS CALCULATED WITH A BODY CENTERED LATTICE PARAMETER OF 2.8101 +OR- 5 ANGSTROM: W. B. PEARSON, HANDBOOK OF LATTICE SPACINGS AND STRUCTURES OF METALS, VOL. 4 (PERGAMON PRESS, NEW-YORK, 1958). 0.001 ANGSTROM WAS ADDED TO THE LATTICE PARAMETER OF FE-SI AS A CORRECTION FOR THE W CONTENT.

TABLE I



41--39---1
IRON-NICKEL ALLOY

FE 90 WT PERCENT
NI 10 WT PERCENT

VO = 0.1269 CC/G
VOI= 0.1267 CC/G

CO = 4.46 KM/SEC

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE STANDARD SAMPLE HOLDER MATERIAL.

TABLE

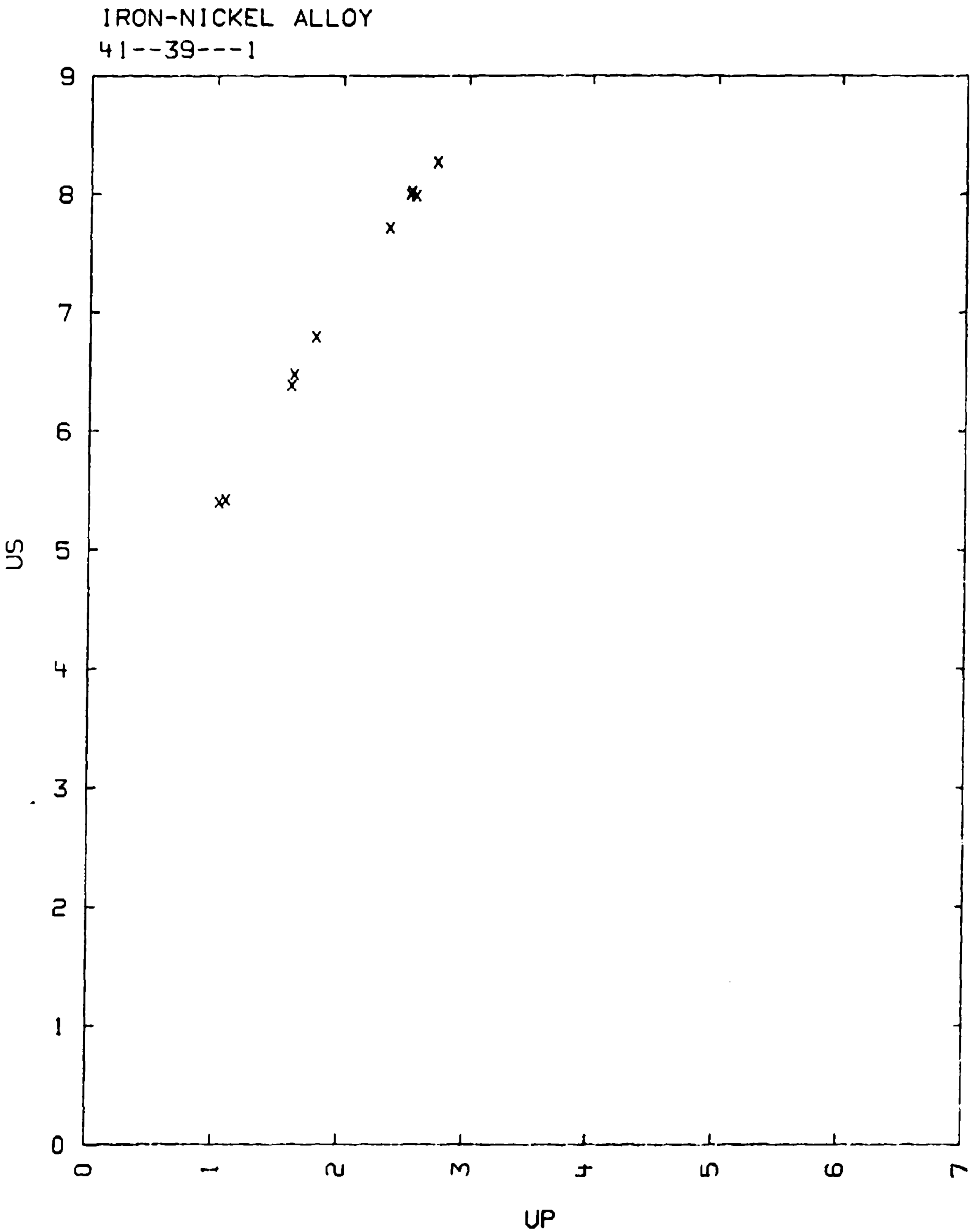
SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
7.883	5.39	1.04	442.	0.8071	CU	5.40
7.885	5.41	1.09	465.	0.7985	CU	5.47
7.883	6.38	1.60	805.	0.7492	CU	6.22
7.895	6.47	1.63	833.	0.7481	CU	6.27
7.883	6.79	1.80	963.	0.7349	CU	6.53
7.896	7.71	2.38	1449.	0.6913	CU	7.37
7.885	8.00	2.54	1602.	0.6825	CU	7.61
7.896	8.02	2.55	1615.	0.6820	CU	7.63
7.870	7.98	2.58	1620.	0.6767	CU	7.65
7.883	8.27	2.75	1793.	0.6675	CU	7.92

US = 3.626 + 1.711*UP KM/SEC
SIG US = 0.058 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YOPK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL COPPER
3) VOI WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED BY OWEN YATES AND SULLY, PROC. PHYS. SOC. (LONDON) VOL 49, P. 315 (1937)

TABLE I



41--39---2
IRON-NICKEL ALLOY

FE 82 WT PERCENT
NI 18 - -

VO = 0.1256 CC/G
VOI= 0.1262 CC/G

CO = 4.40 KM/SEC

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE STANDARD SAMPLE HOLDER MATERIAL.

TABLE

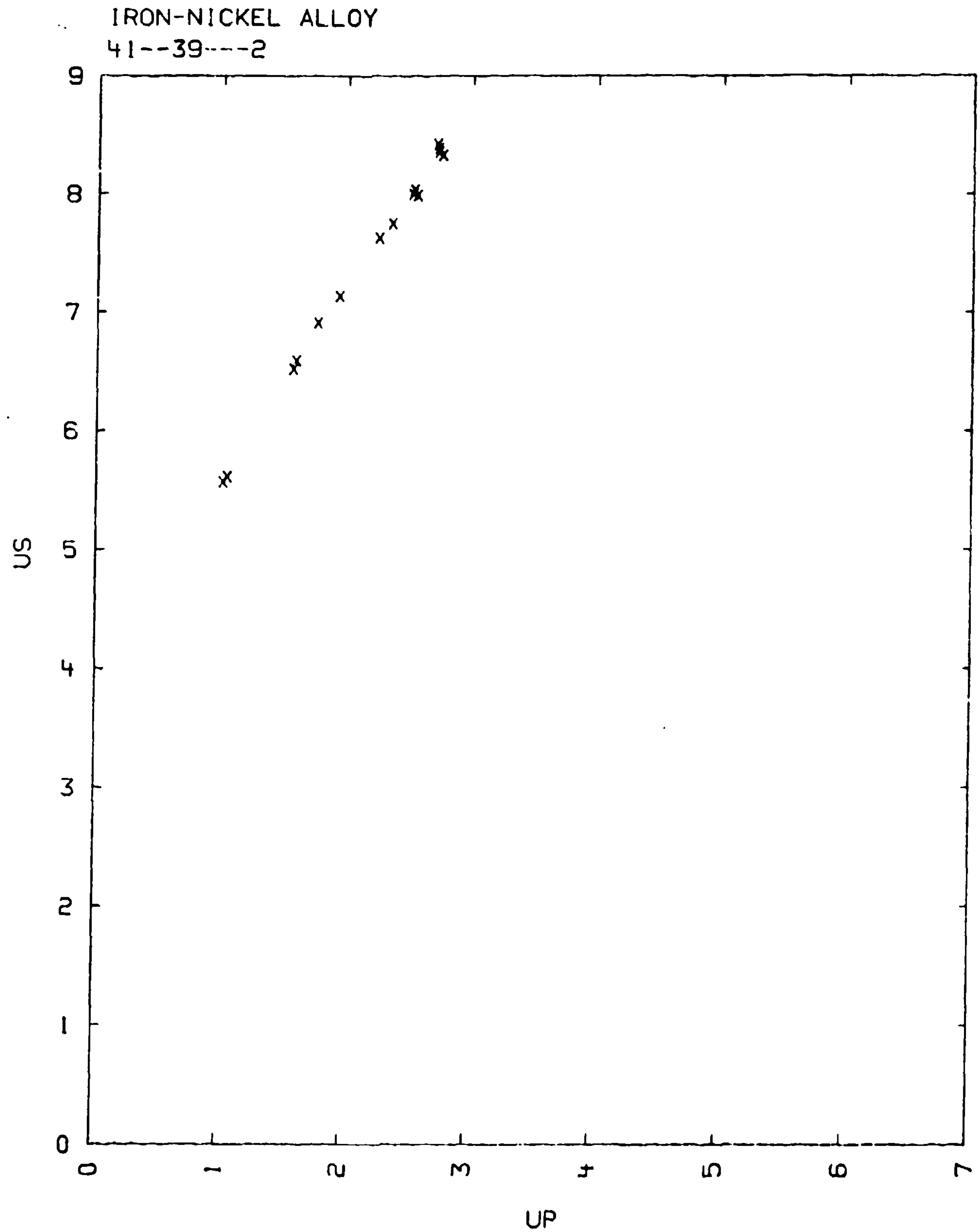
SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
7.962	5.56	1.02	452.	0.8165	CU	5.40
7.962	5.61	1.06	473.	0.8111	CU	5.45
7.962	6.52	1.58	820.	0.7577	CU	6.22
7.962	6.58	1.61	843.	0.7553	CU	6.27
7.962	6.90	1.78	978.	0.7420	CU	6.53
7.962	7.13	1.95	1107.	0.7265	CU	6.77
7.962	7.62	2.26	1371.	0.7034	CU	7.22
7.962	7.74	2.37	1461.	0.6938	CU	7.37
7.962	8.00	2.53	1612.	0.6837	CU	7.61
7.962	8.03	2.54	1624.	0.6837	CU	7.63
7.962	7.98	2.56	1627.	0.6792	CU	7.65
7.962	8.42	2.72	1823.	0.6770	CU	7.91
7.962	8.38	2.73	1821.	0.6742	CU	7.92
7.962	8.35	2.73	1815.	0.6731	CU	7.91
7.962	8.32	2.76	1828.	0.6683	CU	7.94

US = 3.957 + 1.608*UP KM/SEC
SIG US = 0.055 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES. HIGH VELOCITY IMPACT PHENOMENA. KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL COPPER
3) VOI WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED BY OWEN YATES AND SULLY. PROC. PHYS. SOC. (LONDON) VOL. 49, P. 315 (1937)

TABLE I



41--39---3
IRON-NICKEL ALLOY

FE 74 WT PERCENT
NI 26 - -

VO = 0.1255 CO = 4.37 KM/SEC
VOI= 0.1256 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE STANDARD SAMPLE HOLDER MATERIAL.

TAB'

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
7.974	5.48	1.03	450.	0.8120	CU	5.40
7.974	5.49	1.06	464.	0.8069	CU	5.45
7.974	5.49	1.08	473.	0.8033	CU	5.47
7.974	6.44	1.58	811.	0.7547	CU	6.22
7.974	6.53	1.61	838.	0.7534	CU	6.27
7.974	6.84	1.79	976.	0.7383	CU	6.53
7.974	7.07	1.96	1105.	0.7228	CU	6.77
7.974	7.48	2.27	1354.	0.6965	CU	7.22
7.974	7.69	2.37	1453.	0.6918	CU	7.37
7.974	7.94	2.54	1608.	0.6801	CU	7.61
7.974	7.96	2.55	1619.	0.6796	CU	7.63
7.974	8.03	2.56	1639.	0.6812	CU	7.65
7.974	8.13	2.76	1789.	0.6605	CU	7.92
7.974	8.18	2.78	1813.	0.6601	CU	7.94

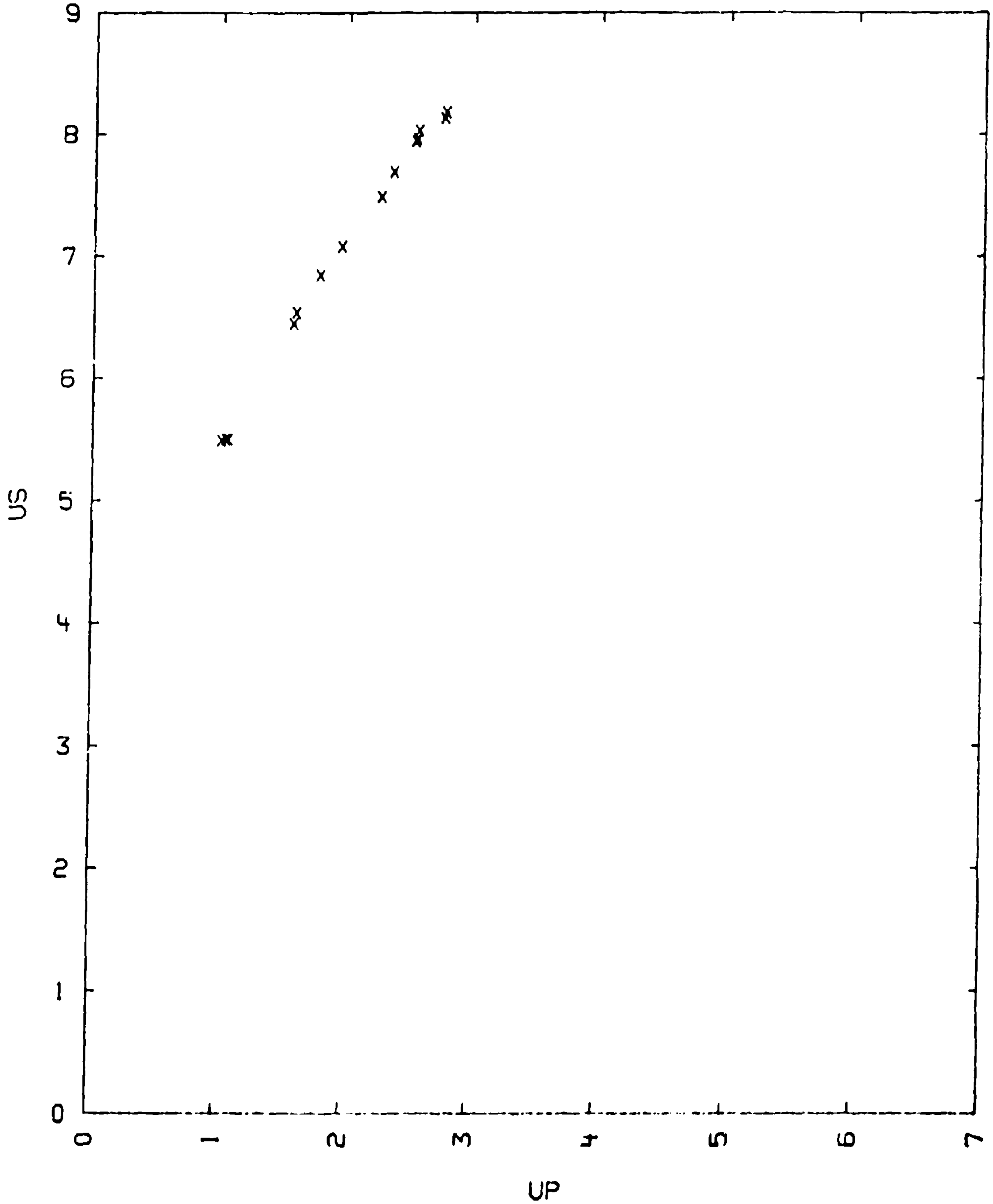
US = 3.877 + 1.591*UP KM/SEC
SIG US = 0.087 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES. HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL COPPER
3) VOI WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED BY OWEN YATES AND SULLY, PROC. PHYS. SOC. (LONDON) VOL. 49, P. 315, (1937)

TABLE I

IRON-NICKEL ALLOY
41--39---3



41--51---1
IRON-CHROMIUM MIXTURE
FE-CR

NI 0.3-0.03 WT PERCENT
CU 0.00'-0.0001 WT PERCENT
SI 0.0 -0.0001 WT PERCENT
MN 0.003-0.0003 WT PERCENT
CR SEE TABLE
FE REMAINDER

V0 = 0.1297-0.1313 CC/G
V0I= 0.1284-0.1306 CC/G

IN THE TABLE BELOW, THE PERCENTAGE OF CHROMIUM IS LISTED IN THE FIRST COLUMN. THE DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURES IN KILOBARS.

TABLE

W(CR)	RHO0	US1	UP1	P1	V1/V0	US2	UP2	P2	V2/V0
9.77	7.757	5.14	0.337	134	0.934	3.97	0.349	138	0.931
9.77	7.757	5.14	0.329	131	0.936	3.89	0.338	134	0.934
17.3	7.726	5.17	0.393	157	0.924	4.39	0.572	217	0.883
17.3	7.773	5.17	0.384	155	0.926	4.31	0.560	213	0.885
25.7	7.645	5.43	0.499	207	0.908	5.21	0.744	304	0.861
25.7	7.642	5.43	0.499	207	0.908	5.12	0.750	305	0.859
30.1	7.615	5.46	0.536	223	0.902	5.12	0.784	311	0.857
30.1	7.620	5.46	0.572	238	0.895	5.03	0.742	302	0.861

US1 =

COMMENTS:

1) SOURCE: GUST W.H. AND ROYCE E.B.
J. APPL. PHYS., VOL.41, P.2443, (1970)
LAWRENCE LIVERMORE LABORATORY,
LIVERMORE, CALIFORNIA 94550
2) EXPERIMENTAL TECHNIQUE C1: FOR EACH WAVE THE SHOCK AND FREE SURFACE VELOCITIES WERE MEASURED.
DATA REDUCTION TECHNIQUE A: WHERE UFS = 2UP
STANDARD MATERIAL ALUMINUM 2024.
3) THE FREE SURFACE VELOCITIES WERE MEASURED BY A MIRROR INCLINED AT A SMALL ANGLE WITH RESPECT TO THE SAMPLE SURFACE. THE ANGLES USED WERE 0.5 DEGREES AND 1.5 DEGREES.
4) THE AVERAGE UNCERTAINTIES OF THE MEASURED SHOCK AND FREE SURFACE VELOCITIES ARE 2 PERCENT.
5) P1 IS THE PRESSURE OF THE LOW TEMPERATURE ALPHA TO EPSILON TRANSITION -PHASE DRAGRAM: SEE MATERIAL 41---17.
6) V0I HAS BEEN CALCULATED FROM THE FOLLOWING CUBIC LATTICE CONSTANTS: A = 2.8703 ANGSTROM FOR CR/FE = 9.77/90.23, AND A = 2.8725 ANGSTROM FOR CR/FE = 30.1/69.9. SEE PEARSON, METAL PHYSICS AND PHYSICAL METALLURGY, VOL. 4 (PERGAMON PRESS, N.Y. 1958).

TABLE I

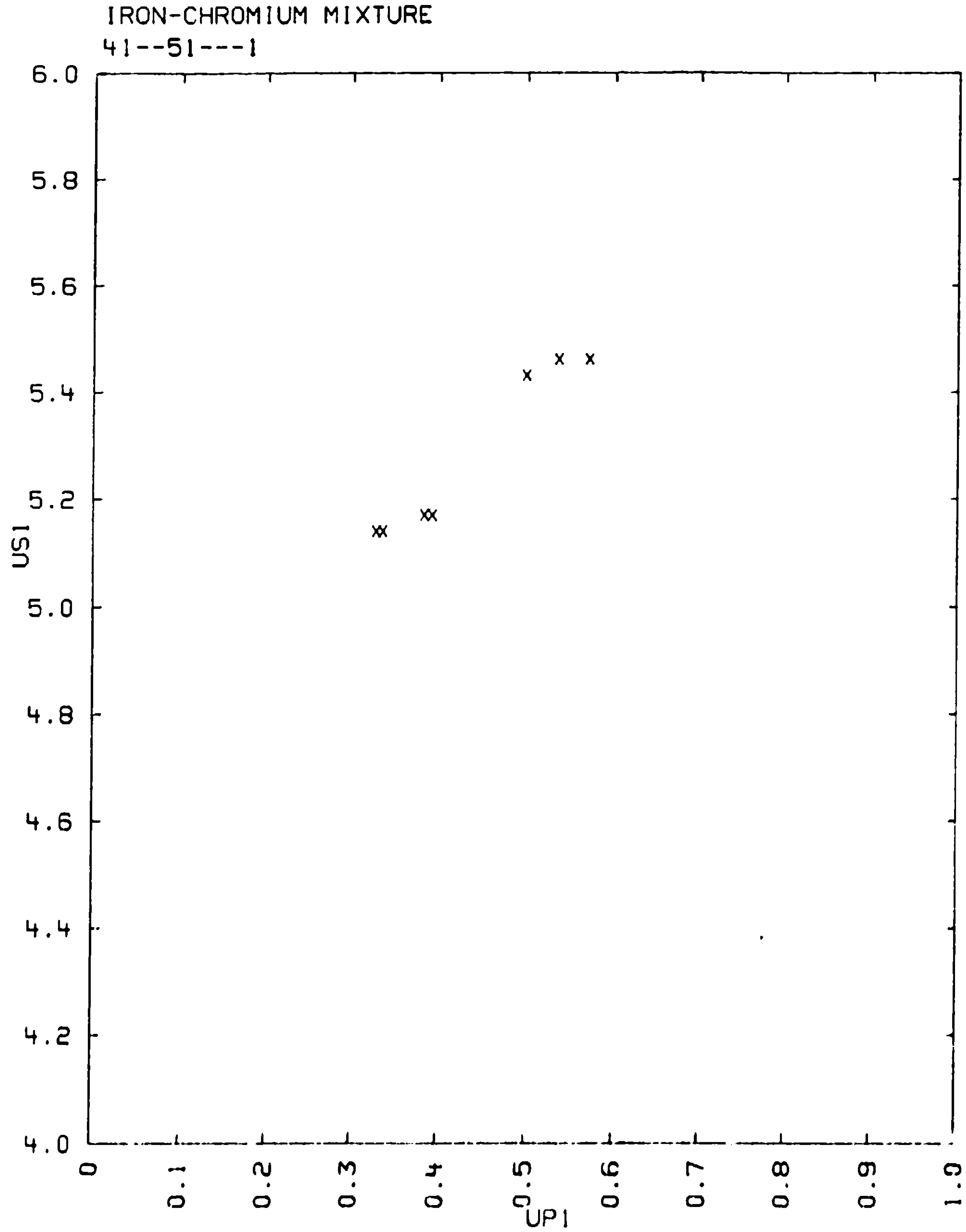
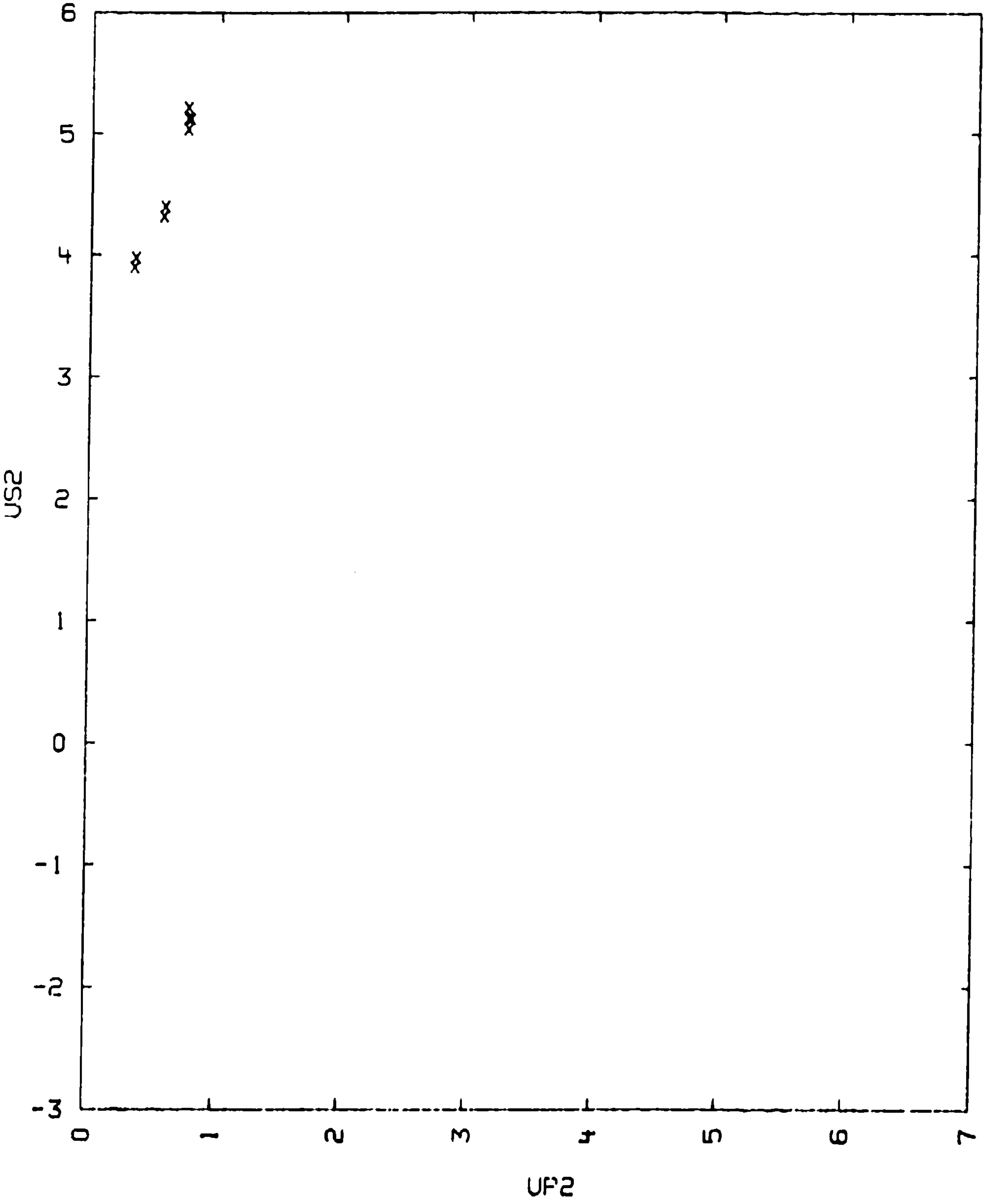

IRON-CHROMIUM MIXTURE
41--51---1
6.0
5.8
5.6
5.4
5.2
5.0
4.8
4.6
4.4
4.2
4.0
US1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
UP1

TABLE I

IRON-CHROMIUM MIXTURE
41--51---1



41--51--39---1
IRON-CHROMIUM-NICKEL MIXTURE (STEEL-STAINLESS)

FE-CR-NI

CU 0.003 - 0.0001 WT PERCENT
SI 0.10 - 0.001 WT PERCENT
MN 0.003 - 0.0003 WT PERCENT
CR SEE TABLE
NI SEE TABLE
FE REMAINDER

V0 = 0.1267-0.1289 CC/G

IN TABLE I BELOW, THE PERCENTAGES OF CR AND NI ARE LISTED IN THE FIRST TWO COLUMNS. SUBSCRIPTS 1, 2 AND 3 ARE THE ELASTIC WAVE AND THE FIRST AND SECOND SHOCK WAVES RESPECTIVELY. THE DENSITY IS GIVEN IN G/CC AND VELOCITIES IN KM/SEC. (ID) IS THE IDENTIFICATION BETWEEN TABLES.
IN TABLE II, PRESSURES ARE GIVEN IN KILOBARS.

TABLE I

W(CR)	W(NI)	RHO0	US1	UP1	US2	UP2	US3	UP3	ID
5.93	8.79	7.821			5.18	0.271	3.74	0.329	1
5.93	8.79	7.823			5.18	0.265	3.72	0.359	2
12.1	7.73	7.778	5.72	0.045	4.98	0.217	3.42	0.263	3
15.9	7.8	7.761			4.99	0.205	3.64	0.263	4
15.9	7.8	7.759			4.99	0.209	3.68	0.263	5
18.1	8.22	7.830			5.45	0.183	4.43	0.276	6
18.1	8.22	7.833			5.45	0.164			7
21.7	8.15	7.881			5.31	0.291			8
21.7	8.15	7.880			5.38	0.297			9
6.32	12.2	7.852			4.77	0.262	3.24	0.281	10
11.7	12.1	7.888			4.98	0.210	3.56	0.270	11
5.91	16.0	7.894			4.90	0.203	3.82	0.304	12

US =

TABLE II

W(CR)	W(NI)	P1	V1/V0	P2	V2/V0	P3	V3/V0	ID
5.93	8.79			110	0.947	127	0.931	1
5.93	8.79			107	0.949	134	0.923	2
12.1	7.73	20	0.992	87	0.957	99	0.943	3
15.9	7.8			79	0.959	92	0.943	4
15.9	7.8			81	0.958	94	0.943	5
18.1	8.22			78	0.966	110	0.943	6
18.1	8.22			70	0.970			7
21.7	8.15			122	0.945			8
21.7	8.15			126	0.945			9
6.32	12.2			98	0.945	103	0.939	10

11.7	12.1	83	0.958	99	0.941	11
5.91	16.0	78	0.959	108	0.932	12

COMMENTS:

1) SOURCE: GUST, W. H. AND ROYCE, E. B.
J. APPL. PHYS. VOL.41, P.2443, (1970)
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA, USA.

2) EXPERIMENTAL TECHNIQUE C1: FOR EACH WAVE THE SHOCK VELOCITY (US) AND THE FREE SURFACE VELOCITY (UFS) WERE MEASURED.
DATA REDUCTION TECHNIQUE A: WHERE UFS = 2UP
THE ELASTIC WAVE IS IGNORED EXCEPT IN ENTRY 3.

3) THE FREE SURFACE VELOCITIES WERE MEASURED BY A MIRROR INCLINED AT A SMALL ANGLE WITH RESPECT TO THE SAMPLE SURFACE. THE ANGLES USED WERE 0.5 DEGREES AND 1.5 DEGREES.

4) THE AVERAGE UNCERTAINTIES OF THE MEASURED SHOCK AND FREE SURFACE VELOCITIES ARE 2 PERCENT.

5) P2 IS THE PRESSURE OF THE LOW TEMPERATURE ALPHA TO EPSILON TRANSITION -PHASE DRAGRAM: SEE MATERIAL 41---17.

TABLE I

IRON-CHROMIUM-NICKEL MIXTURE (STEEL-STAINLESS)

41--51--39---1

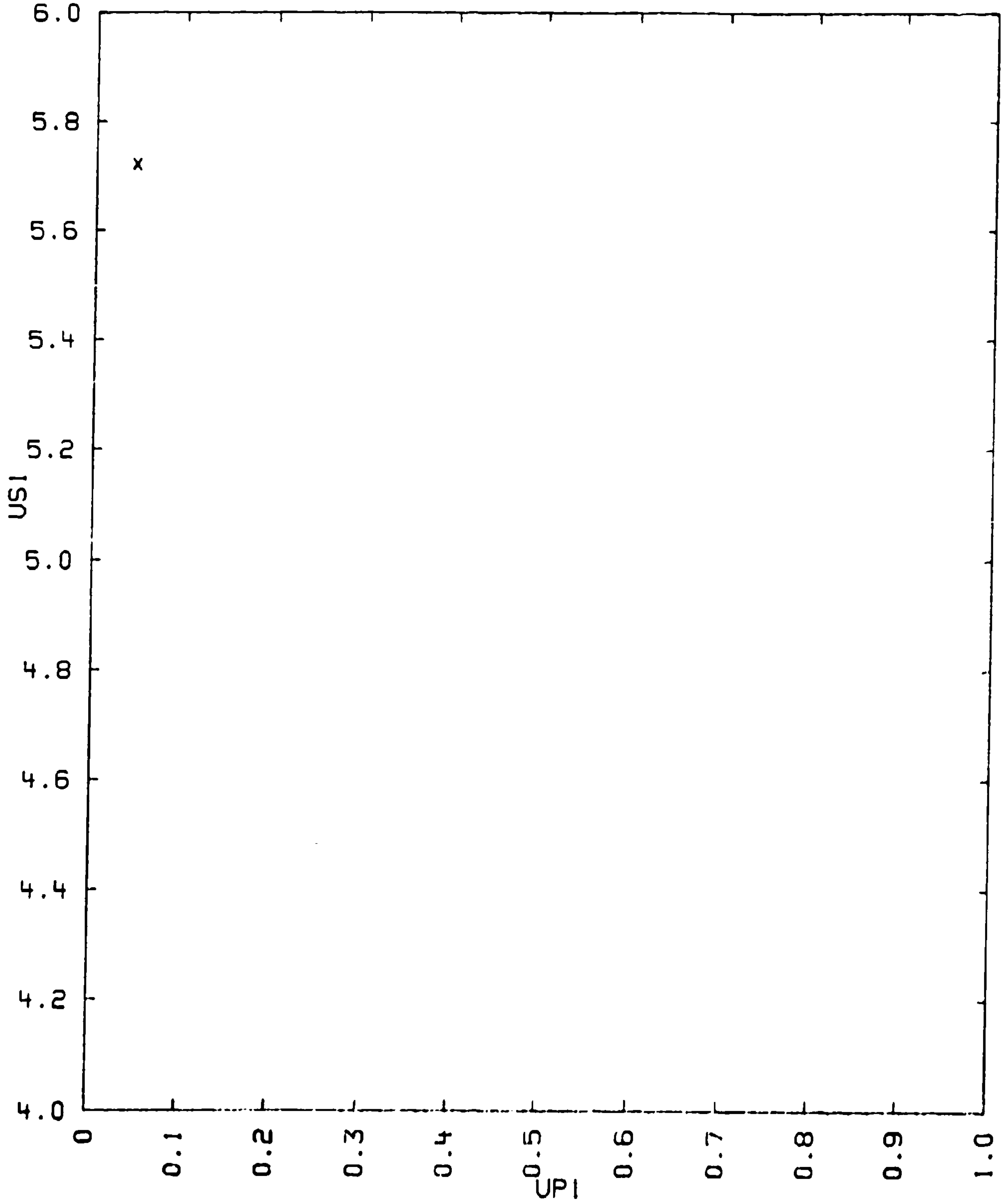


TABLE I

IRON-CHROMIUM-NICKEL MIXTURE (STEEL-STAINLESS)

41--51--39---1

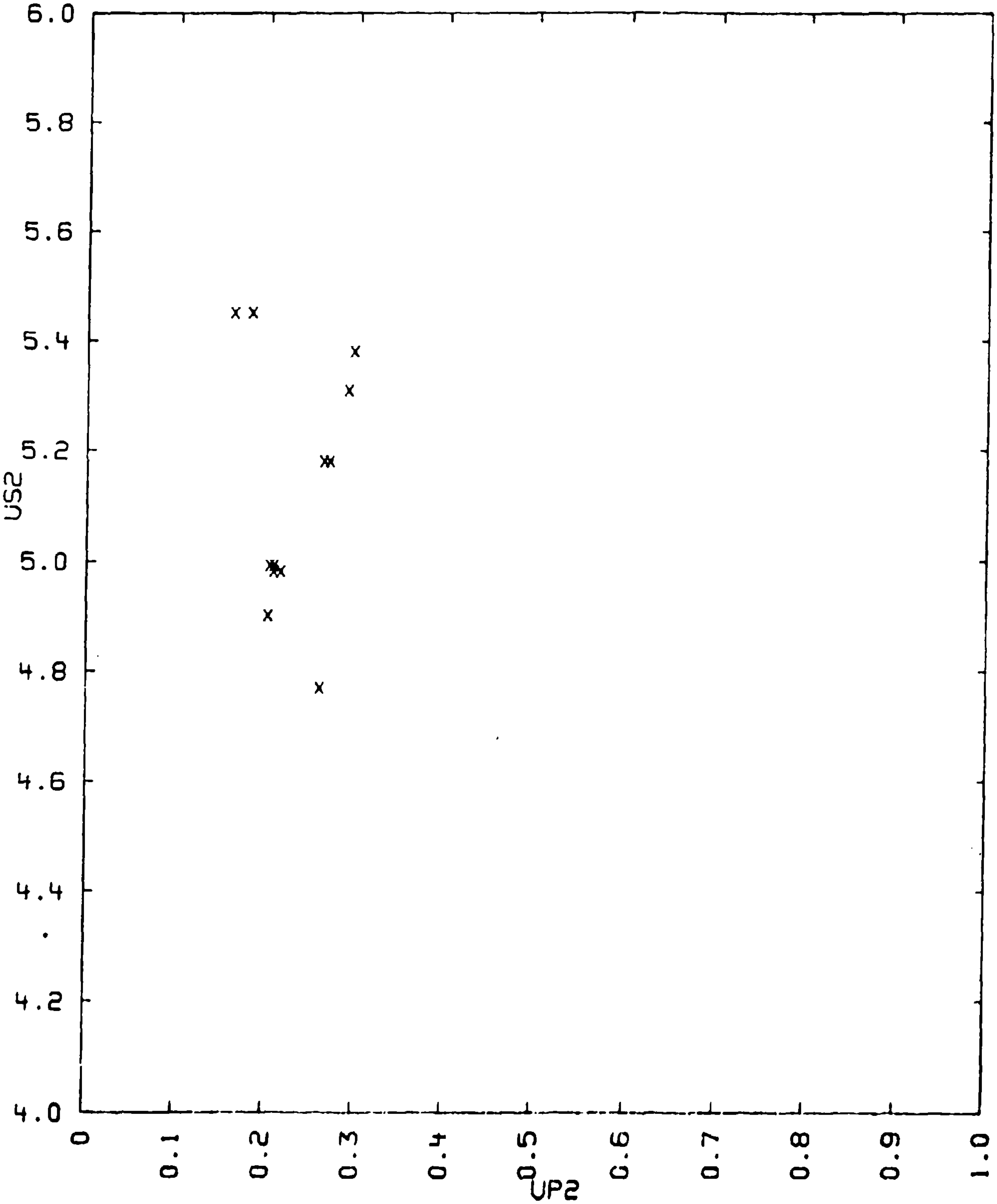
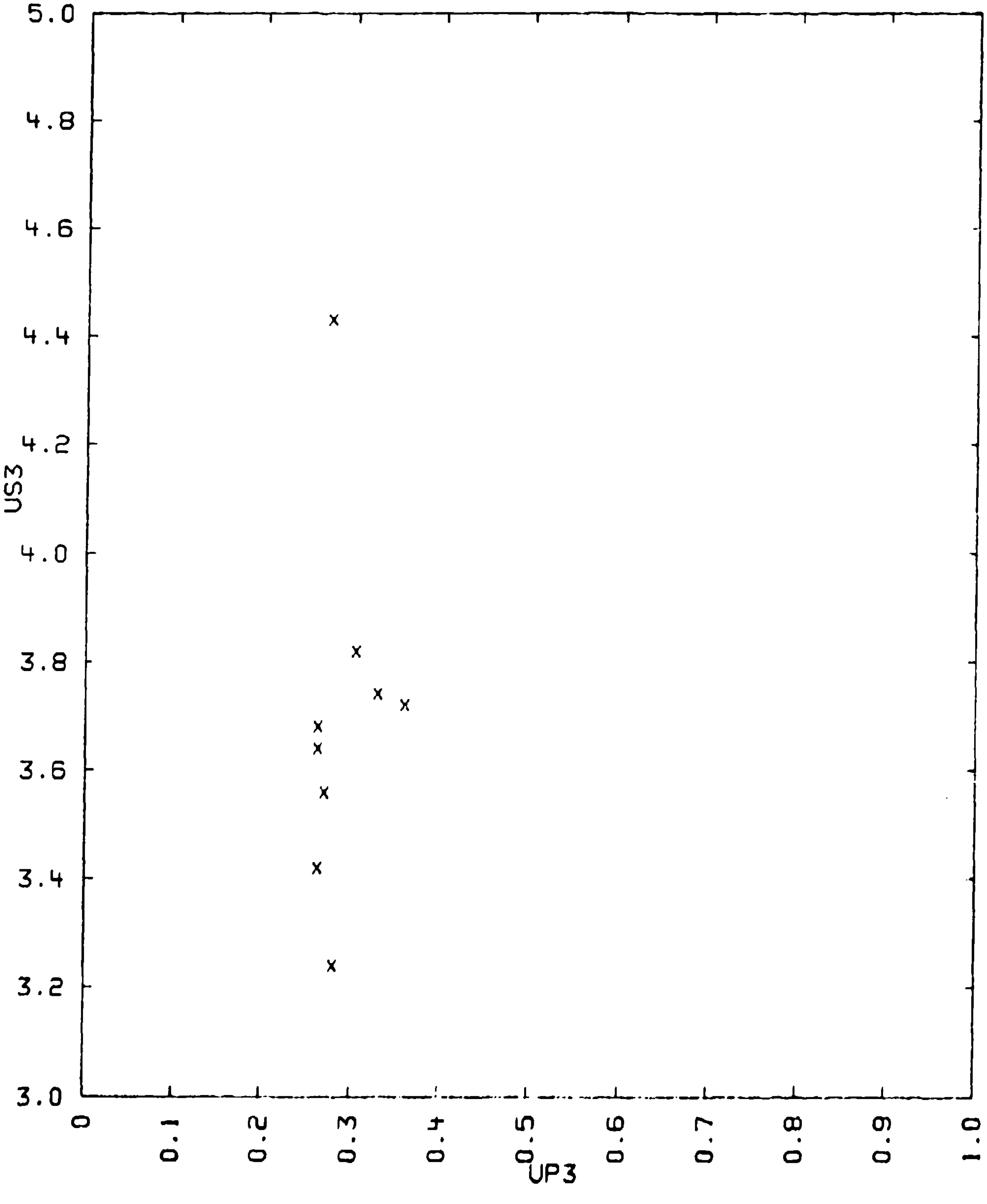


TABLE I

IRON-CHROMIUM-NICKEL MIXTURE (STEEL-STAINLESS)

41--51--39---1



STAINLESS STEEL (TYPE 304)

FE	REMAINDER	
CR	18-20	WT PERCENT
NI	8-12	WT PERCENT
MN	2.	WT PERCENT
SI	1.	WT PERCENT
C	0.08	WT PERCENT

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

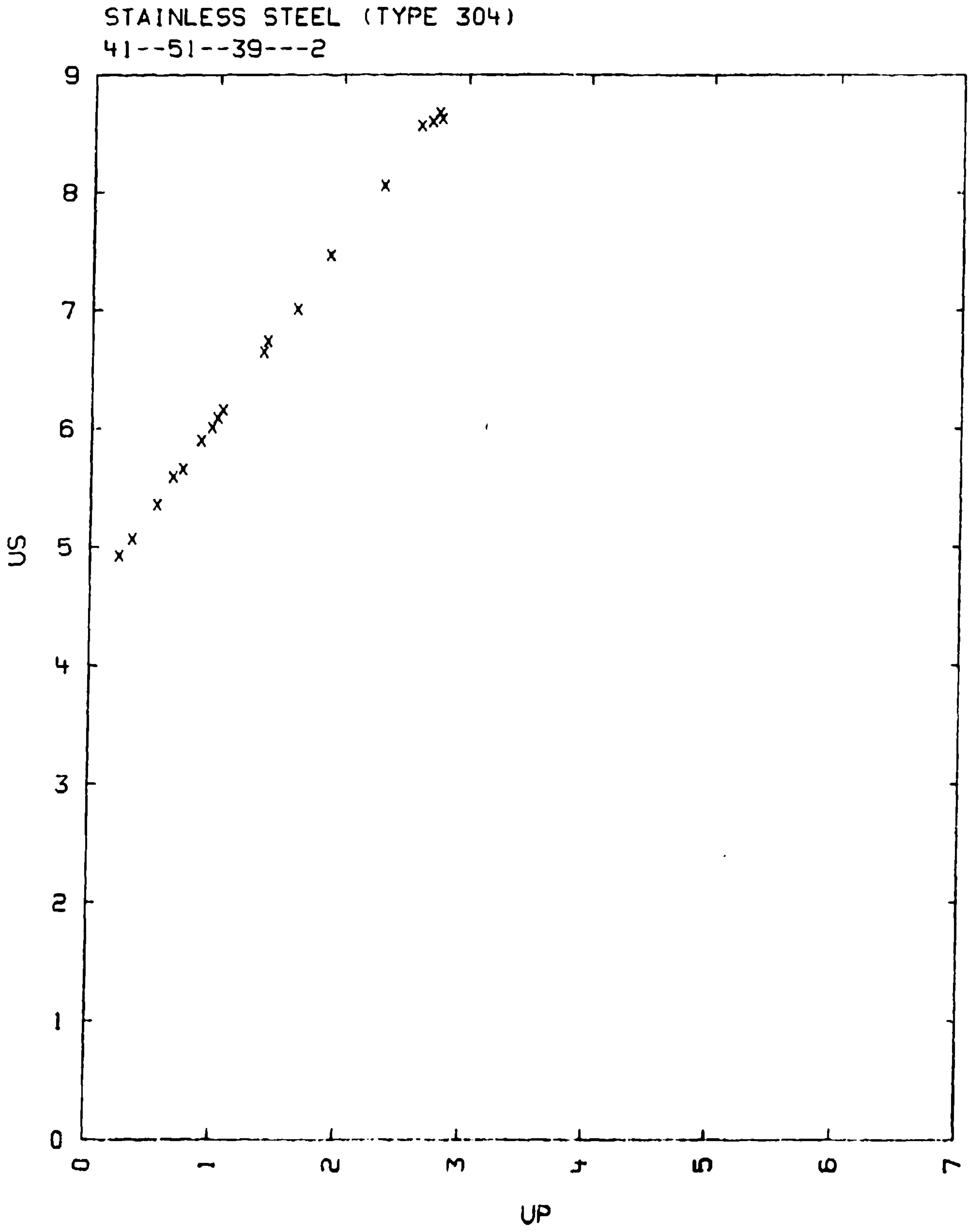
SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
7.890	4.92	0.23	89.	0.9533	CU	4.29
7.890	5.06	0.34	136.	0.9328	CU	4.45
7.890	5.35	0.53	224.	0.9009	CU	4.73
7.890	5.58	0.66	291.	0.8817	CU	4.92
7.890	5.65	0.74	330.	0.8690	CU	5.04
7.890	5.89	0.89	414.	0.8489	CU	5.26
7.890	6.01	0.97	460.	0.8386	CU	5.37
7.890	6.08	1.01	485.	0.8339	CU	5.44
7.890	6.15	1.06	514.	0.8276	CU	5.51
7.890	6.64	1.38	723.	0.7922	CU	5.96
7.890	6.73	1.41	749.	0.7905	CU	6.03
7.890	6.73	1.41	749.	0.7905	CU	6.03
7.890	7.01	1.65	913.	0.7646	CU	6.37
7.890	7.46	1.91	1124.	0.7440	CU	6.76
7.890	8.05	2.33	1480.	0.7106	CU	7.37
7.903	8.56	2.63	1779.	0.6928	CU	7.81
7.890	8.60	2.71	1839.	0.6849	CU	7.91
7.890	8.67	2.77	1895.	0.6805	CU	8.00
7.903	8.62	2.79	1901.	0.6763	CU	8.13

US = 4.569 + 1.490*UP KM/SEC
SIGMA US = 0.041 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B (STANDARD BASE PLATE AS SHOWN)
3) V(DP/DE) = 2.17, HEL = 2.3 KBAR
4) COMPOSITION FROM AMERICAN SOC. FOR METALS HANDBOOK (A.S.M., OHIO (1961)) VOL. 1
5) HUGONIOT ELASTIC LIMIT 2.3 KBAR

TABLE I



41--51--39---3
STAINLESS STEEL (TYPE 304L)

FE	REMAINDER	
CR	18-20	WT PERCENT
NI	8-12	WT PERCENT
MN	2.	WT PERCENT
SI	1.	WT PERCENT
C	0.03	WT PERCENT

VO = 0.1265 CC/G   CL = 5.79 KM/SEC   CO = 4.49 KM/SEC
CS = 3.16 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
7.903	4.90	0.23	89.	0.9531	CU	4.29
7.903	5.10	0.34	137.	0.9333	CU	4.45
7.903	5.35	0.53	224.	0.9009	CU	4.73
7.903	5.55	0.66	289.	0.8811	CU	4.92
7.903	5.65	0.74	330.	0.8690	CU	5.04
7.903	5.86	0.89	412.	0.8481	CU	5.26
7.903	6.02	0.97	461.	0.8389	CU	5.37
7.903	6.06	1.01	484.	0.8333	CU	5.44
7.903	6.26	1.14	564.	0.8179	CU	5.62
7.903	6.60	1.38	720.	0.7909	CU	5.98
7.903	6.68	1.41	744.	0.7889	CU	6.03
7.903	6.98	1.65	910.	0.7636	CU	6.37
7.903	7.46	1.91	1126.	0.7440	CU	6.76
7.903	8.05	2.33	1482.	0.7106	CU	7.37
7.903	8.57	2.71	1835.	0.6838	CU	7.91

US = 4.569 + 1.490*UP KM/SEC
SIGMA US = 0.030 KM/SEC

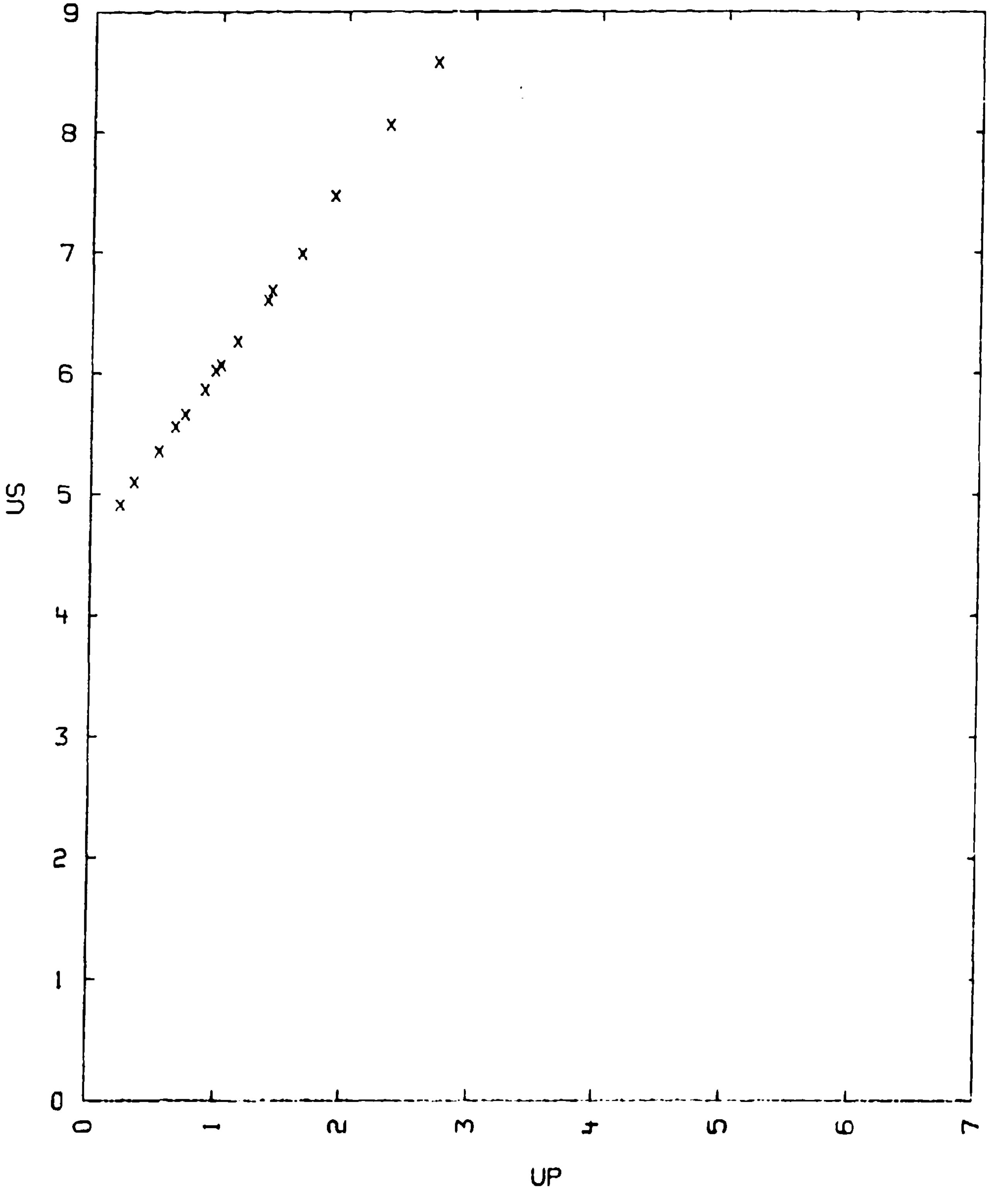
COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B
3) COMPOSITION FROM AMERICAN SOC. FOR METALS HANDBOOK (A.S.M., OHIO, 1961) VOL. 1

TABLE I

STAINLESS STEEL (TYPE 304L)

41--51--39---3



41--51--39---4
STAINLESS STEEL (TYPE 347)

FE	REMAINDER	
CR	17.-19.	WT PERCENT
NI	9.-13.	WT PERCENT
MN	2.	WT PERCENT
SI	2.	WT PERCENT
C	0.08	WT PERCENT

V0 = 0.1263 CC/G

CO = 4.55 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
7.920	4.55	0.	0.	1.0000	CO	0.
7.920	5.60	0.72	319.	0.8714	2024 AL	6.84
7.920	6.03	0.96	458.	0.8408	2024 AL	7.34

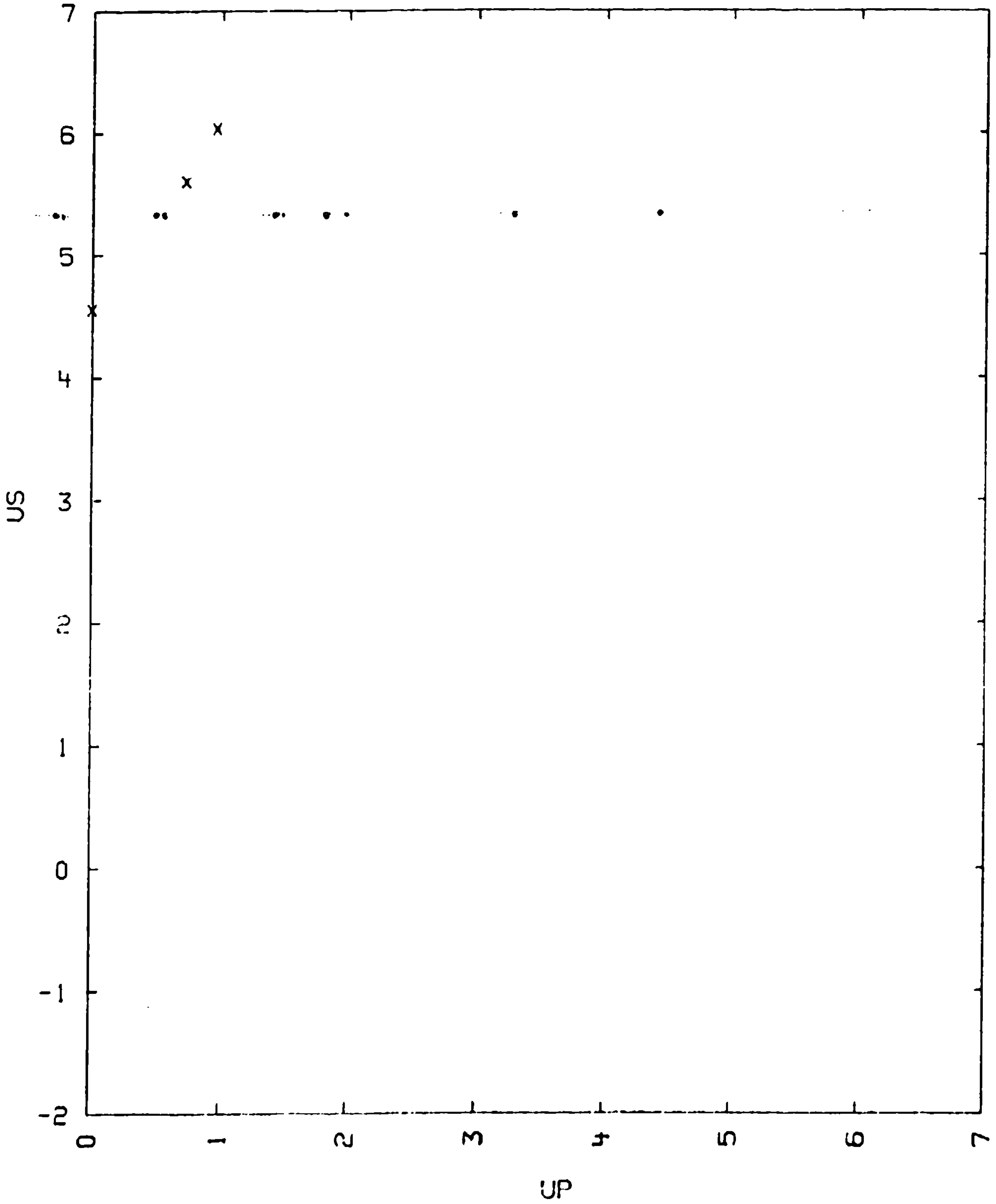
US = 4.541 + 1.522•UP KM/SEC
SIGMA US = 0.047 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES.
HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B (STANDARD BASE PLATE AS SHOWN)
3) COMPOSITION FROM AMERICAN SOC. FOR METALS HANDBOOK (A.S.M., OHIO, 1961) VOL. 1

TABLE I

STAINLESS STEEL (TYPE 347)
41--51--39---4



41--51--39---5
STEEL, 304 STAINLESS

FE	69.86	WT. PERCENT	C	.065	WT. PERCENT
CR	18.73	- -	P	.029	- -
NI	8.80	- -	S	.028	- -
MN	1.62	- -	REST	.070	- -
SI	.49	- -			
MO	.14	- -			
CU	.17	- -			

V0 = 0.1265 CC/G   CL = 5.74 KM/SEC   C0 = 4.47 KM/SEC
CS = 3.12 KM/SEC

THE TABLE LISTS RHOO IN G/CC, VELOCITIES IN KM/SEC AND P IN KBARS. FS= FANSTEEL, ST.ST.= STAINLESS STEEL AND WF= WEIGHTING FACTOR.

TABLE

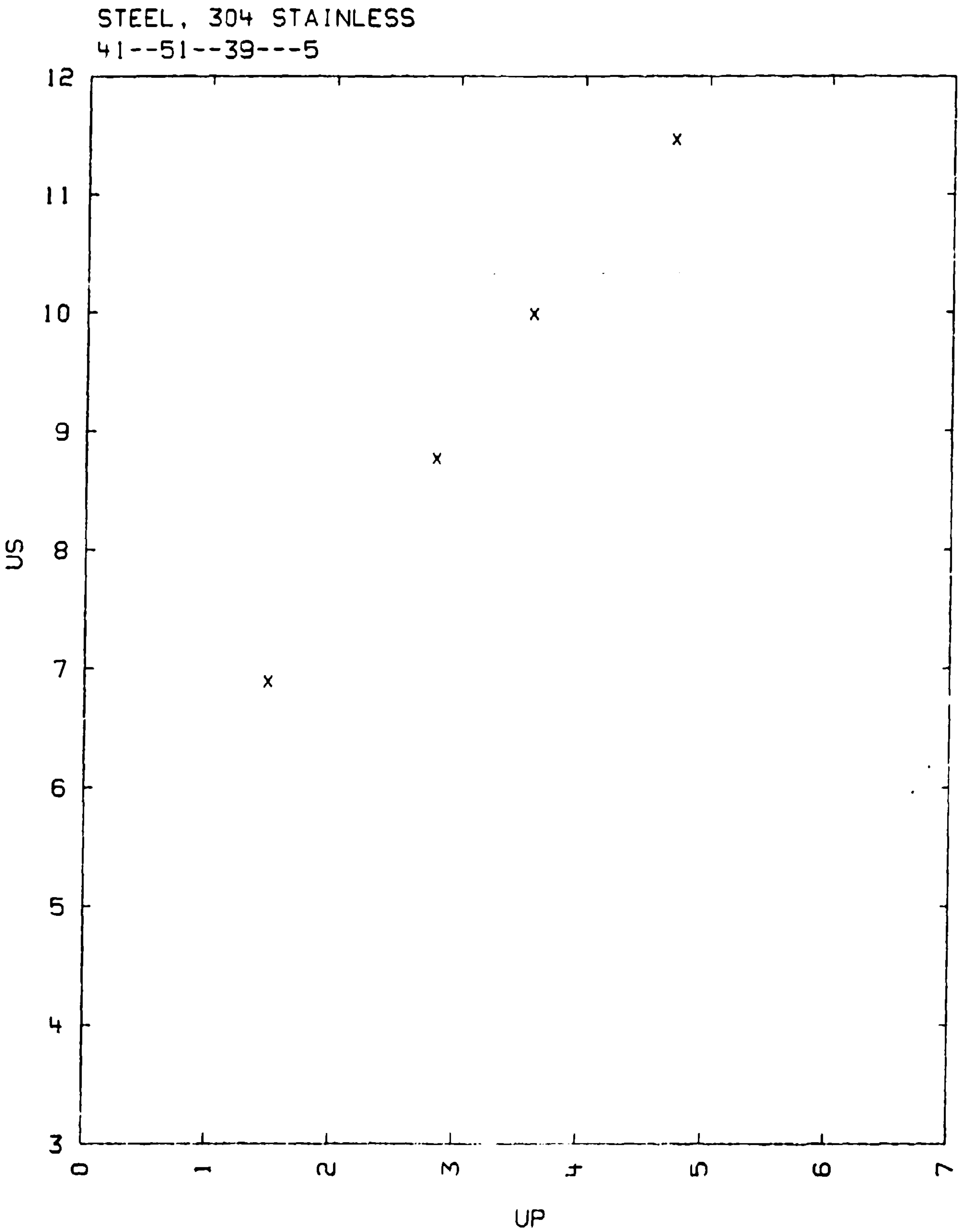
------ SAMPLE				-------	--IMPACTOR	---	
RHOO	US	UP	P	V/VO	MAT	U	WF
7.905	6.877	1.497	814.	.7823	ST.ST.	2.993	3
7.905	8.760	2.824	1956.	.6776	ST.ST.	5.648	3
7.905	9.980	3.607	2846.	.6386	ST.ST.	7.214	3
7.905	11.459	4.730	4285.	.587	FS	7.883	1

US = 4.722 + 1.441*UP KM/SEC
SIG.US = 0.023 KM/SEC

COMMENTS:

1) SOURCE: ISBELL W.M., SHIPMAN F.H. AND JONES A.H.
HUGONIOT EQUATION OF STATE OF ELEVEN MATERIALS TO FIVE MBARS
MATERIALS SCIENCE LABORATORY REPORT: MSL-68-13
2) EXPERIMENTAL TECHNIQUE: A
DATA REDUCTION METHOD : A
3) NOMINAL UNCERTAINTIES ARE: (SIG.US)/US = .005 AND (SIG.U)/U = .0005
4) ALSO LISTED ARE: POISSONS RATIO = 0.29, YIELD STRENGTH = 3.8 KBAR
TENSILE - = 6.24 -

TABLE I



41-24-1--93-24-1---1
DUNITE MOOIHOEK MINE, TRANSVAAL (SILICATE ROCK)

OLIVENE:			90 VOLUME PERCENT
FAYALITE	FE2-SI-04	50	- -
FORSTERITE	MG2-SI-04	40	- -
BOWLINGITE	(MG,FE)9-AL2-SI10-030-(0-H)6-MG2	9	- -
ORE	FE3-04 (PROBABLE)	1	

V0 = 0.260 TO 0.272 CC/G   CL = 7.31 KM/SEC
V01= 0.268 CC/G (NOTE 3)

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE SAMPLE HOLDER AND STANDARD MATERIAL.

TABLE

RHO0	US	UP	P	V/V0	US(ST)
3.83	6.55	0.49	123.	0.925	6.16
3.83	6.71	0.74	190.	0.890	6.54
3.78	6.96	1.03	272.	0.852	6.97
3.77	6.71	1.06	268.	0.842	6.97
3.[illegible]	6.71	1.10	267.	0.836	6.99
3.[illegible]	7.05	1.22	326.	0.827	7.23
3.78	7.05	1.26	336.	0.821	7.28
3.78	7.09	1.37	368.	0.807	7.44
3.83	7.29	1.46	408.	0.800	7.59
3.82	7.41	1.52	429.	0.795	7.68
3.80	7.45	1.53	434.	0.795	7.70
3.85	7.40	1.62	461.	0.781	7.82
3.76	7.32	1.63	448.	0.777	7.80
3.82	7.40	2.09	589.	0.718	8.41
3.83	7.50	2.23	640.	0.703	8.61
3.80	7.43	2.31	653	0.690	8.68
3.82	7.55	2.39	687	0.685	8.80
3.80	7.52	2.39	683	0.682	8.79
3.81	7.62	2.49	721	0.674	8.93
3.85	7.93	2.61	798	0.671	9.16
3.78	8.13	2.84	872	0.651	9.44
3.84	8.22	2.89	911	0.649	9.54
3.82	8.47	2.96	960	0.650	9.67
3.77	8.54	2.97	957	0.652	9.67
3.73	8.45	3.05	962	0.639	9.73
3.68	8.48	3.06	955	0.639	9.73
3.82	8.69	3.11	1031	0.643	9.88
3.75	8.79	3.32	1094	0.623	10.12
3.82	9.08	3.37	1168	0.629	10.27
3.80	9.00	3.37	1154	0.625	10.25
3.77	9.09	3.47	1190	0.618	10.37

US = 6.033 + 0.828*UP KM/SEC. FOR UP FROM 0.5 TO 1.6 KM/SEC.
SIGMA US = 0.12 KM/SEC

US = 4.008 + 1.477*UP KM/SEC. FOR UP FROM 2.3 TO 3.5 KM/SEC.

SIGMA US = 0.079 KM/SEC.

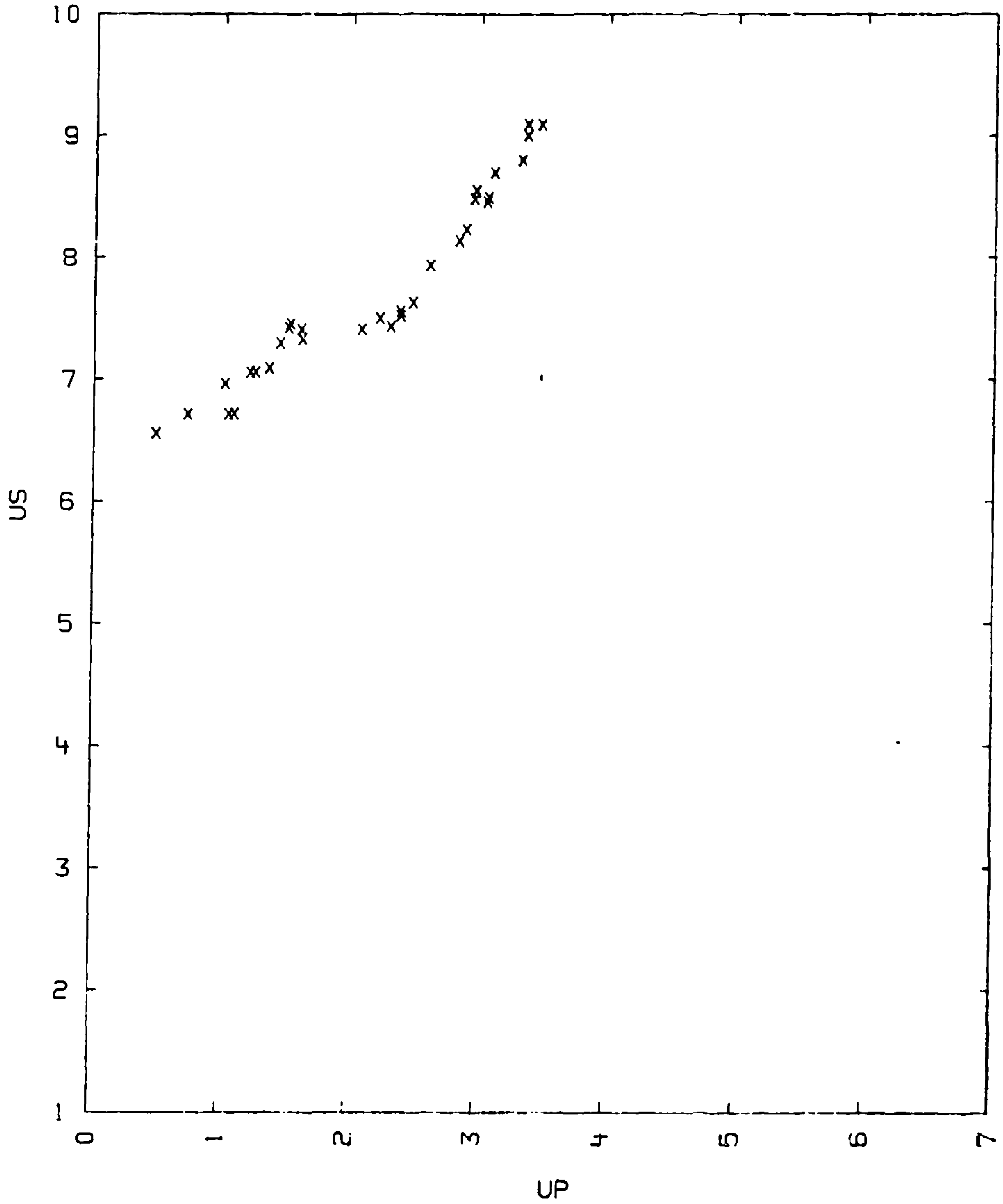
COMMENTS :

1) SOURCE: MCQUEEN R. G. AND MARSH S. P.
PRIVATE COMMUNICATION (1966)
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) VOI WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED FOR OLIVINES IN CRYSTAL DATA DETERMINATIVE TABLES (AMERICAN CRYSTALLOGRAPHIC ASSOC., POLYCRYSTAL BOOK SERVICE, BROOKLYN, N.Y., 1963) 2ND ED.
THE EXACT COMPOSITION OF BOWLINGITE AND ORE WERE NOT GIVEN BUT THEIR DENSITIES WERE ASSUMED TO BE 2.27 AND 5.18 G/CC RESPECTIVELY, WHERE THE ORE WAS TAKEN AS PURE MAGNETITE. SEE W. E. FORD. DANAS TEXTBOOK OF MINERALOGY (JOHN WILEY 1932) 4TH. ED., FOR DESCRIPTION OF BOWLINGITE. THE BOWLINGITE FORMULA GIVEN IS A SIMPLIFICATION OF THE COMPOSITION GIVEN BY S. CAILLERE AND S. HENIN, CLAY MINERAL BULLETIN, VOL. 1, P 138 (1951). THEIR BOWLINGITES BESIDES HAVING 20 WT PERCENT WATER OF HYDRATION ALSO SHOWED VARYING AMOUNTS OF CA AND TI
4) THE MODAL ANALYSIS OF THESE SAMPLES OBTAINED THROUGH BIRCH WAS TAKEN FROM: F. BIRCH, J. GEOPHYS. RES., VOL. 65, P. 1083 (1960)
5) FURTHER WORK IS IN PROGRESS.

TABLE I

DUNITE MOOIHOEK MINE, TRANSVAAL (SILICATE ROCK)

41-24-1--93-24-1---1



53--36---1
ELKONITE 2125C((TUNGSTEN COPPER MIXTURE

CU 74.5 WT PERCENT
W 25.5 WT PERCENT

VO = 0.102 - 0.105 CC/G CL = 4.18 KM/SEC CO = 3.36 KM/SEC
VOI = 0.09663 CC/G CS = 2.15 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

---SAMPLE---					---STANDARD---	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
9.734	2.87	0.29	81.	0.8990	CU	4.31
9.724	3.28	0.40	128.	0.8780	CU	4.48
9.722	3.44	0.51	171.	0.8517	CU	4.63
9.642	3.76	0.59	214.	0.8431	CU	4.76
9.611	3.98	0.67	256.	0.8317	CU	4.88
9.547	4.14	0.79	312.	0.8092	CU	5.05
9.551	4.57	1.01	441.	0.7790	CU	5.38
9.767	5.00	1.17	571.	0.7660	CU	5.66
9.638	5.15	1.27	630.	0.7534	CU	5.80
9.762	5.56	1.45	787.	0.7392	CU	6.10
9.672	5.47	1.45	767.	0.7349	CU	6.08
9.796	5.79	1.62	919.	0.7202	CU	6.35
9.669	5.85	1.69	956.	0.7111	CU	6.45
9.776	5.92	1.76	1019.	0.7027	CU	6.55
9.654	6.66	2.19	1408.	0.6712	CU	7.20
9.775	7.10	2.44	1693.	0.6563	CU	7.61
9.758	7.50	2.67	1954.	0.6440	CU	7.96
9.578	7.61	2.77	2019.	0.6360	CU	8.08

US = 3.289 + 1.581*UP - 0.19/(1+U (3 KM/SEC
SIG US = 0.057 KM/SEC

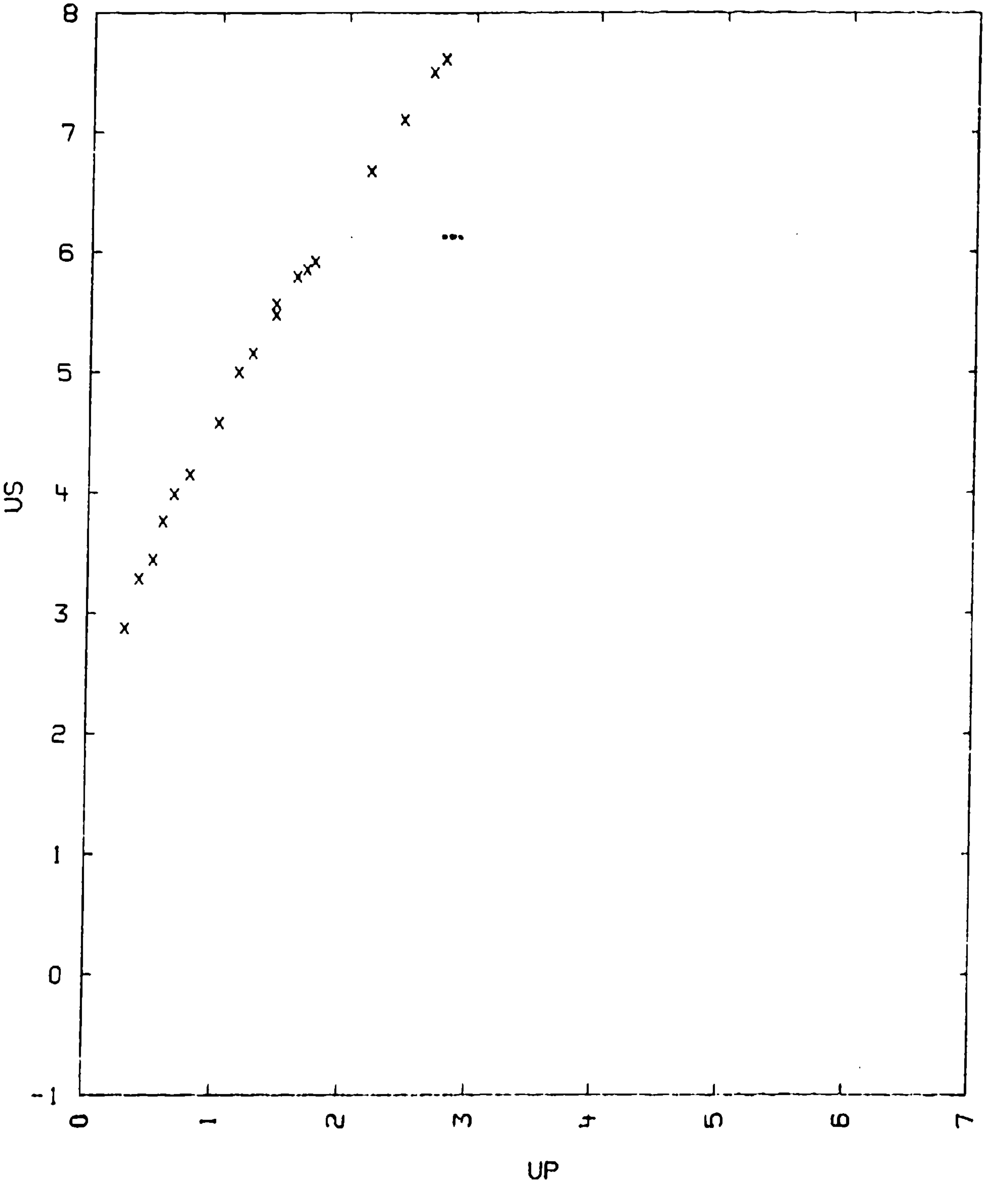
COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE : B
DATA REDUCTION TECHNIQUE : B
3) VOI IS CALCULATED FROM IDEAL MIXTURE THEORY WITH :
VOI(W) = 0.05192 CC/G, FROM WYCKOFF CRYSTAL STRUCTURES (JOHN WILEY AND SONS, N.Y., 1963) VOL. 1.
VO(CU) = 0.1120 CC/G.
4) THE SAMPLES CONSIST OF SINTERED W, INFILTRATED WITH CU.

TABLE I

ELKONITE 2125C((TUNGSTEN COPPER MIXTURE

53--36---1



53--36---2
ELKONITE 1W3 (TUNGSTEN-COPPER MIXTURE)

W 55 WT PERCENT
CU 45 WT PERCENT

V0 = 0.0800 - 0.0845 CC/G CL = 4.55 KM/SEC C0 = 3.36 KM/SEC
V0I = 0.07893 CC/G CS = 2.66 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

SAMPLE					STANDARD	
RHO0	US	UP	P	V/V0	MATERIAL	US(ST)
12.440	3.67	0.34	155.	0.9074	CU	4.48
12.410	3.83	0.44	209.	0.8851	CU	4.63
12.170	4.09	0.51	254.	0.8753	CU	4.76
12.430	4.21	0.58	304.	0.8622	CU	4.88
12.450	4.42	0.68	374.	0.8462	CU	5.05
11.950	4.44	0.80	424.	0.8198	CU	5.21
12.460	4.73	0.88	519.	0.8140	CU	5.38
12.500	5.03	1.05	660.	0.7913	CU	5.66
12.460	5.18	1.16	749.	0.7761	CU	5.84
12.450	5.43	1.30	879.	0.7606	CU	6.08
12.240	5.31	1.34	871.	0.7476	CU	6.10
12.360	5.65	1.48	1034.	0.7381	CU	6.35
12.320	5.78	1.53	1090.	0.7353	CU	6.45
12.360	5.90	1.59	1159.	0.7305	CU	6.55
11.790	6.50	2.03	1556.	0.6877	CU	7.20
12.300	6.79	2.26	1887.	0.6672	CU	7.61
12.020	7.22	2.48	2152.	0.6565	CU	7.96
12.460	7.31	2.56	2332.	0.6498	CU	8.13

US = 3.43 + 1.516*UP - 1.25/(1+UP)**5 KM/SEC
SIG US = 0.065 KM/SEC

COMMENTS:

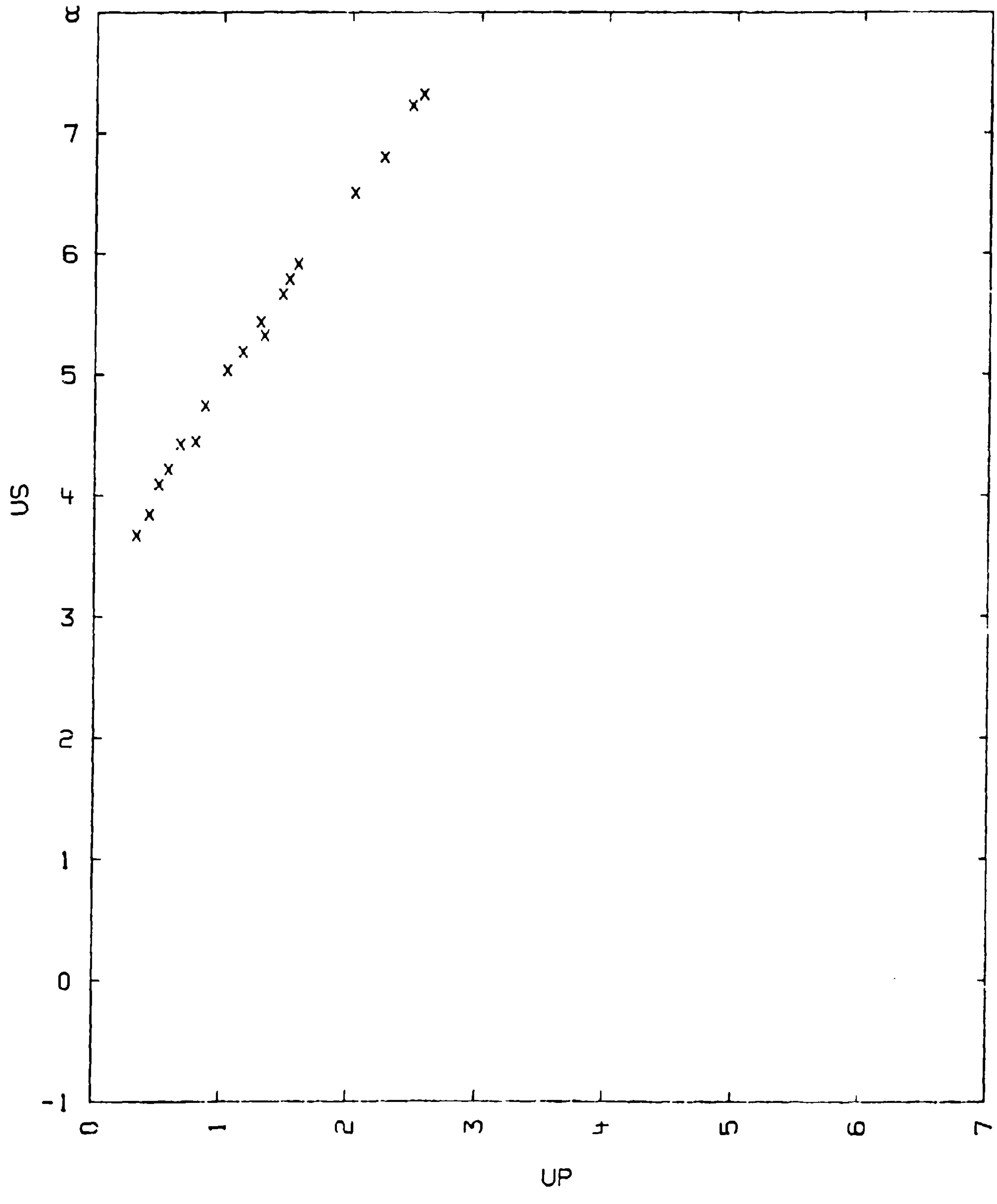
1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J. THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES. HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE : B
   DATA REDUCTION TECHNIQUE : B
3) V0I CALCULATED BY ASSUMING VOLUME ADDITIVITY AND THE CRYSTAL DENSITIES FROM WYCKOFF, CRYSTAL STRUCTURES (JOHN WILEY AND SONS, N.Y., 1963).

4) THE SAMPLES CONSIST OF SINTERED W INFILTRATED WITH CU.
5) V(DP/DE) = 1.8

TABLE I

ELKONITE 1W3 (TUNGSTEN-COPPER MIXTURE)

53--36---2



53--36---3
ELKONITE 3W3 (TUNGSTEN-COPPER MIXTURE)

W   68 WT PERCENT
CU   32 WT PERCENT

V0 = 0.0729 - 0.0721 CC/G   CL = 4.75 KM/SEC   C0 = 3.77 KM/SEC
V0I = 0.07112 CC/G   CS = 2.50 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

SAMPLE					STANDARD	
RHO0	US	UP	P	V/V0	MATERIAL	US(ST)
13.860	4.35	0.53	320.	0.8782	CU	4.87
13.870	5.18	1.07	769.	0.7934	CU	5.80
13.820	6.02	1.57	1306.	0..7392	CU	6.65
13.710	7.20	2.44	2409.	0.6611	CU	8.08

US = 3.807 + 1.404*UP - 0.75/(1+UP)**3 KM/SEC
SIG US = 0.071 KM/SEC

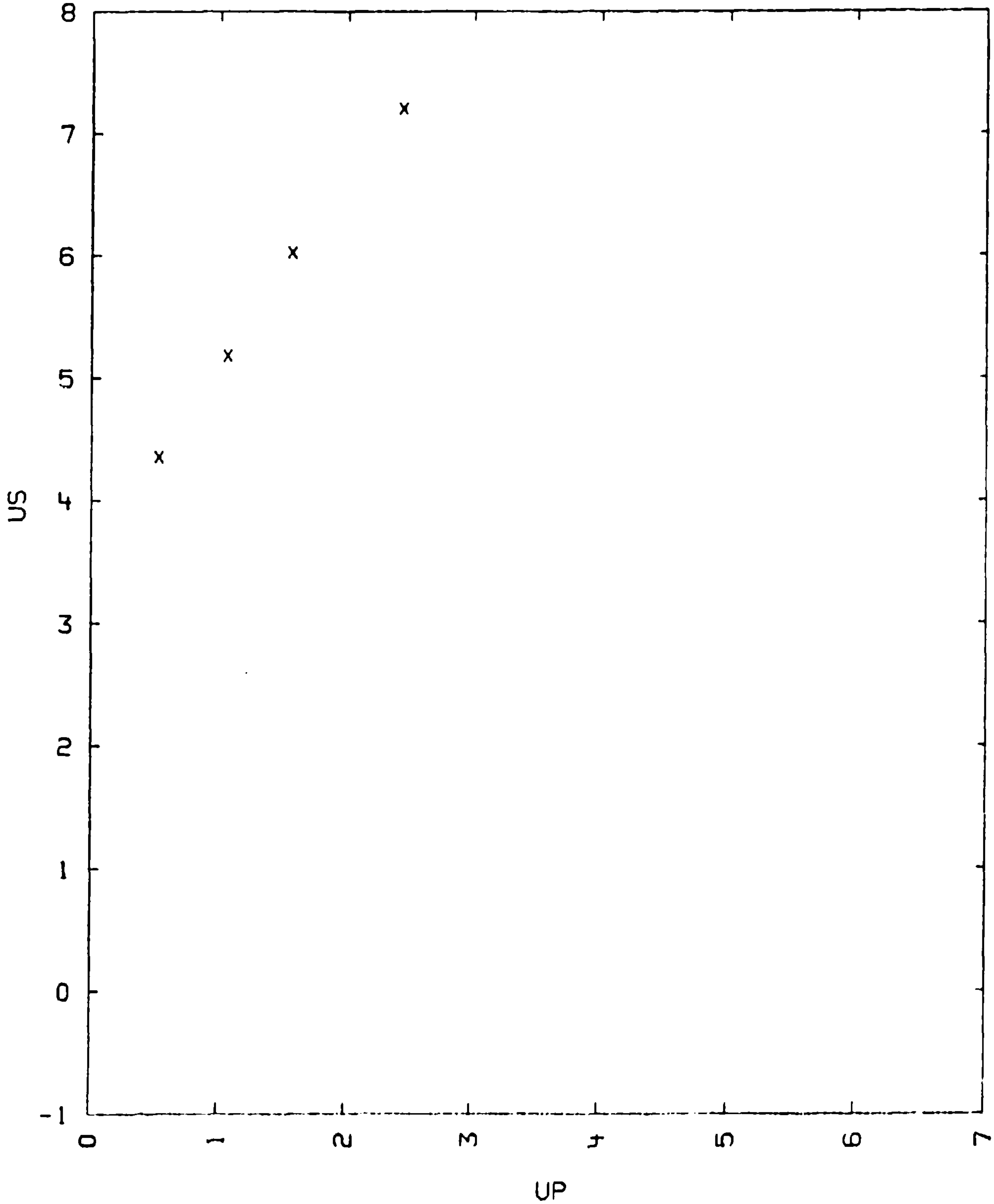
COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE : B
DATA REDUCTION TECHNIQUE : B
3) V0I IS CALCULATED BY ASSUMING VOLUME ADDITIVITY AND THE DENSITIES GIVEN BY WYCKOFF CRYSTAL STRUCTURES. (JOHN WILEY AND SONS, N.Y., 1963) VOL. I.
4) THE SAMPLE IS MADE OF SINTERED W INFILTRATED WITH CU.
5) V(DP/DE) = 1.74

TABLE I

ELKONITE 3W3 (TUNGSTEN-COPPER MIXTURE)

53--36---3



53--36---4
ELKONITE 10W3 (TUNGSTEN-COPPER MIXTURE)

W 76 WT PERCENT
CU 24 WT PERCENT

V0 = 0.0671 - 0.0675 CC/G CL = 4.77 KM/SEC C0 = 3.77 KM/SEC
V0I = 0.06632 CC/G CS = 2.53 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
14.890	3.53	0.19	100.	0.9462	CU	4.27
14.830	3.62	0.21	113.	0.9420	CU	4.31
14.840	3.78	0.26	146.	0.9312	CU	4.41
14.830	3.73	0.29	160.	0.9223	CU	4.45
14.830	4.02	0.41	244.	0.8980	CU	4.67
14.810	4.39	0.58	377.	0.8679	CU	4.98
14.900	4.79	0.82	585.	0.8288	CU	5.41
14.860	4.72	0.82	575.	0.8263	CU	5.41
14.880	4.81	0.84	601.	0.8254	CU	5.44
14.840	4.88	0.87	630.	0.8217	CU	5.51
14.830	5.53	1.28	1050.	0.7685	CU	6.23
14.820	5.97	1.62	1433.	0.7286	CU	6.79
14.860	6.26	1.84	1712.	0.7061	CU	7.16
14.820	6.65	2.13	2099.	0.6797	CU	7.65
14.880	6.72	2.19	2190.	0.6741	CU	7.75
14.890	6.74	2.24	2248.	0.6677	CU	7.82

US = 3.865 + 1.318*UP - 0.97/(1+UP)**3 KM/SEC
SIG US = 0.04 KM/SEC

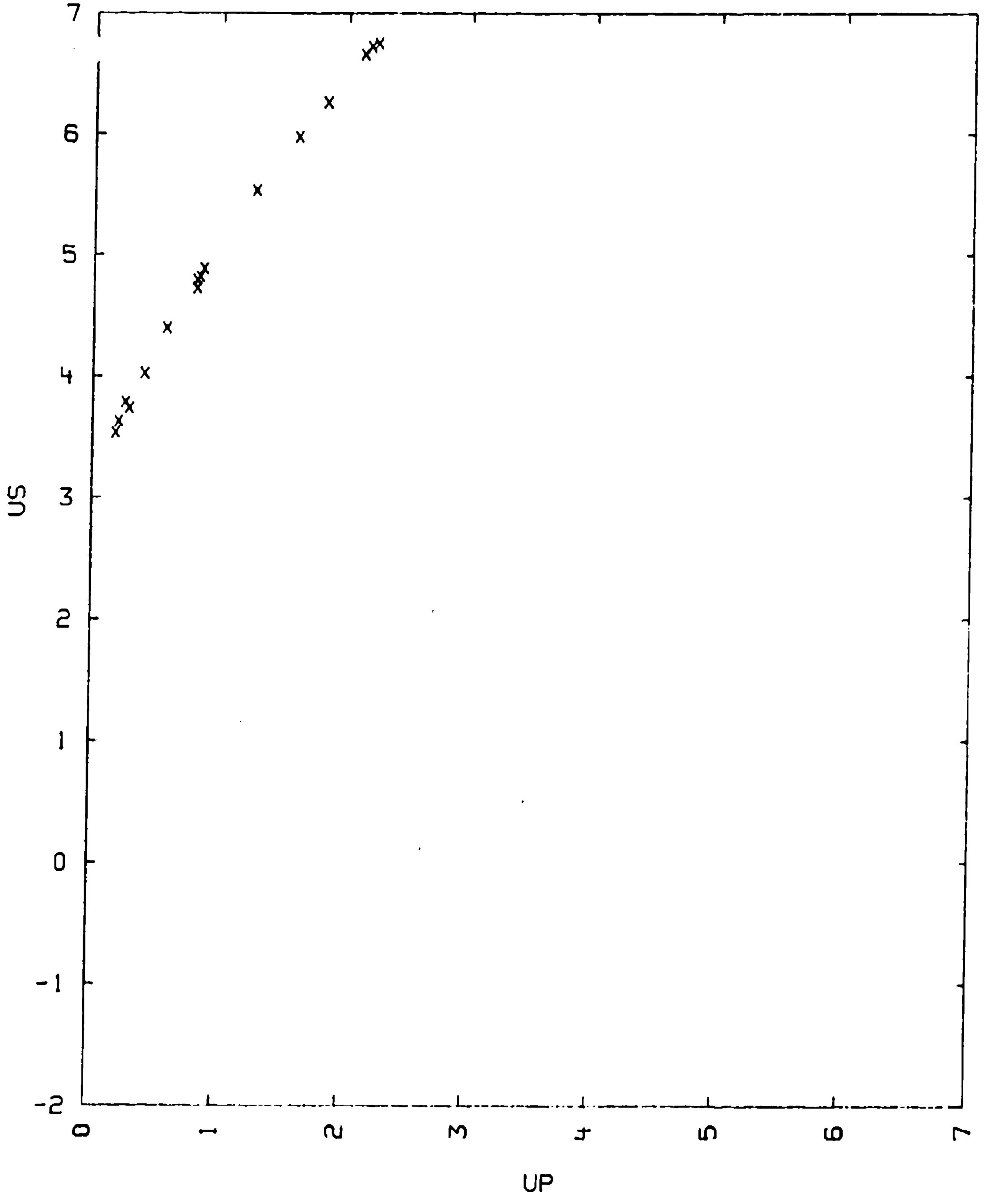
COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE : B
DATA REDUCTION TECHNIQUE : B
3) V0I IS CALCULATED BY ASSUMING VOLUME ADDITIVITY AND THE COMPONENT DENSITIES OBTAINED FROM WYCKOFF, CRYSTAL STRUCTURES (JOHN WILEY AND SONS, N.Y., 1963).
4) THE SAMPLES ARE SINTERED W INFILTRATED WITH CU.
5) V(DP/DE) = 1.70

TABLE I

ELKONITE 10W3 (TUNGSTEN-COPPER MIXTURE)

53--36---4



53--39--36---1
TUNGSTEN-NICKEL-COPPER ALLOY

W 90 PERCENT
NI 7.5 PERCENT
CU 2.5 PERCENT

V0 = 0.05952 CC/G.
V01 = 0.05774 CC/G.

IN THE TABLE BELOW, DENSITY IS GIVEN G/CC., VELOCITIES IN KM/SEC., AND PRESSURE IN KILOBARS.

TABLE

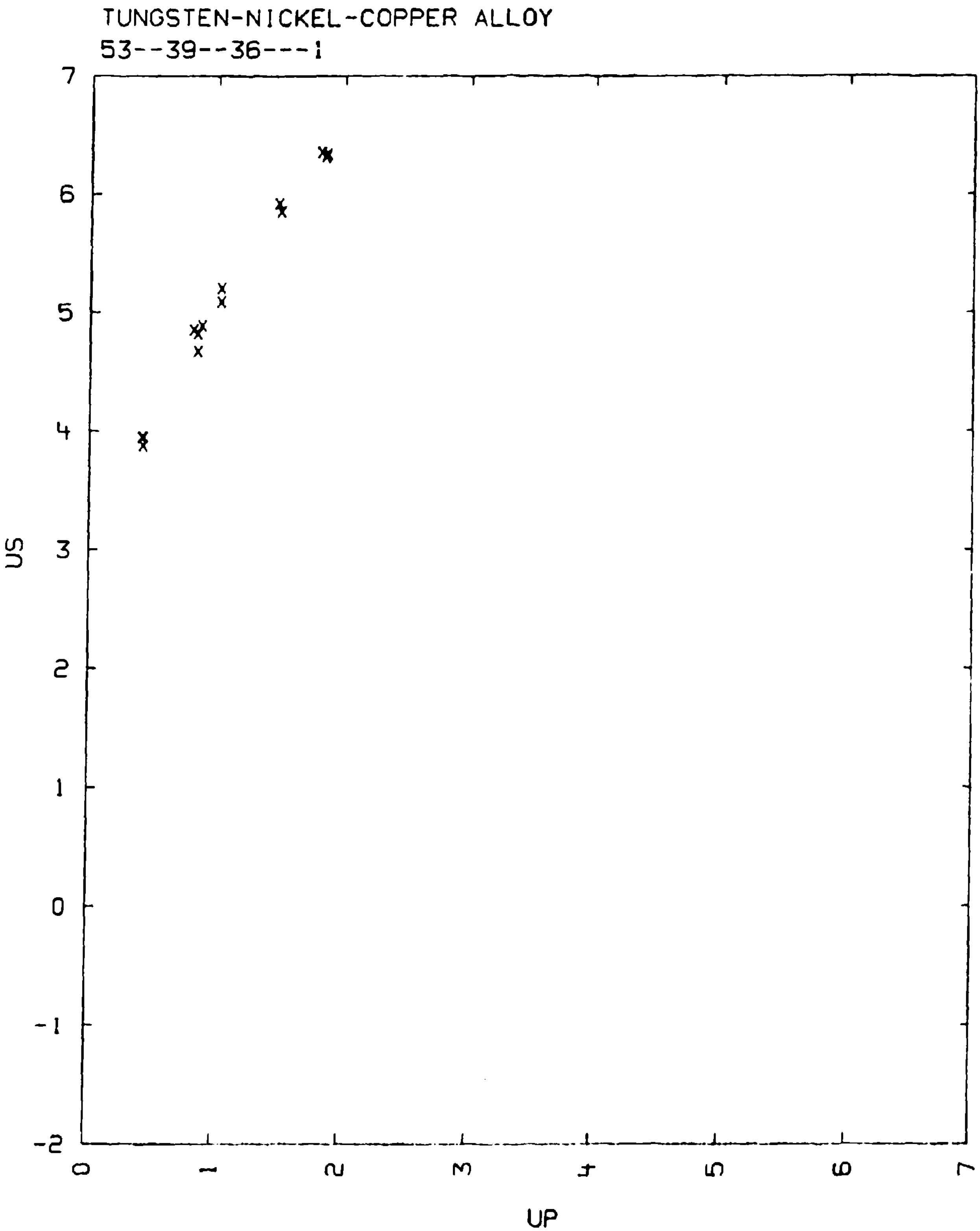
RHO0	US	UP	P	V/V0
16.8	3.94	0.41	271	0.896
-	3.87	0.42	273	0.891
-	3.94	0.42	278	0.893
-	4.85	0.82	668	0.831
-	4.67	0.85	667	0.818
-	4.81	0.85	687	0.823
-	4.88	0.89	730	0.818
-	5.08	1.04	887	0.795
-	5.20	1.04	908	0.800
-	5.85	1.51	1484	0.742
-	5.92	1.49	1482	0.748
-	6.35	1.82	1941	0.713
-	6.31	1.85	1961	0.707
-	6.34	1.86	1981	0.707

US = 2.95 + 2.47*UP - 0.342*UP**2 KM/SEC. SIGMA US = 0.07 KM/SEC.

COMMENTS:

1) SOURCE: HART AND SKIDMORE I. C.
PRIVATE COMMUNICATION (1965)
SKIDMORE, I. C.
APPLIED MATERIALS RESEARCH, VOL. 4, P. 131, (1965)
2) EXPERIMENTAL TECHNIQUE A.
DATA REDUCTION TECHNIQUE B
FE AND BRASS STANDARDS WERE USED.
3) THE TUNGSTEN ALLOY SAMPLE WAS A POROUS SINTER. ASSUMING A GRUNEISEN EQUATION OF STATE WITH A CONSTANT GRUNEISEN CONSTANT OF 1.88, IT IS FOUND THAT THE DATA IS CONSISTENT WITH THE RELATIONS FOR THE VOIDLESS MATERIAL WHICH MAY BE REPRESENTED BY US = 3.94 + 1.44 UP KM/SEC.

TABLE I



TUNGSTEN-NICKEL-COPPER ALLOY
53--39--36---1
US
UP
7
6
5
4
3
2
1
0
-1
-2
0
1
2
3
4
5
6
7

53--39--36---2
FANSTEEL 77 (TUNGSTEN ALLOY)

TUNGSTEN W 90.0 +OR- 0.5 WT PERCENT
NICKEL NI 6.0 +OR- 0.3 WT PERCENT
COPPER CU 4.0 +OR- 0.2 WT PERCENT

VO = 0.05893 +OR- 0.0013 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UP	P	V/VO
16.89	5.34	1.076	970	0.7985
-	5.79	1.387	1360	0.7604
-	6.38	1.809	1550	0.7165
-	8.42	3.468	4930	0.5881
-	9.08	3.818	5860	0.5795

US = 3.94 + 1.32*UP +OR- 0.09 KM/SEC

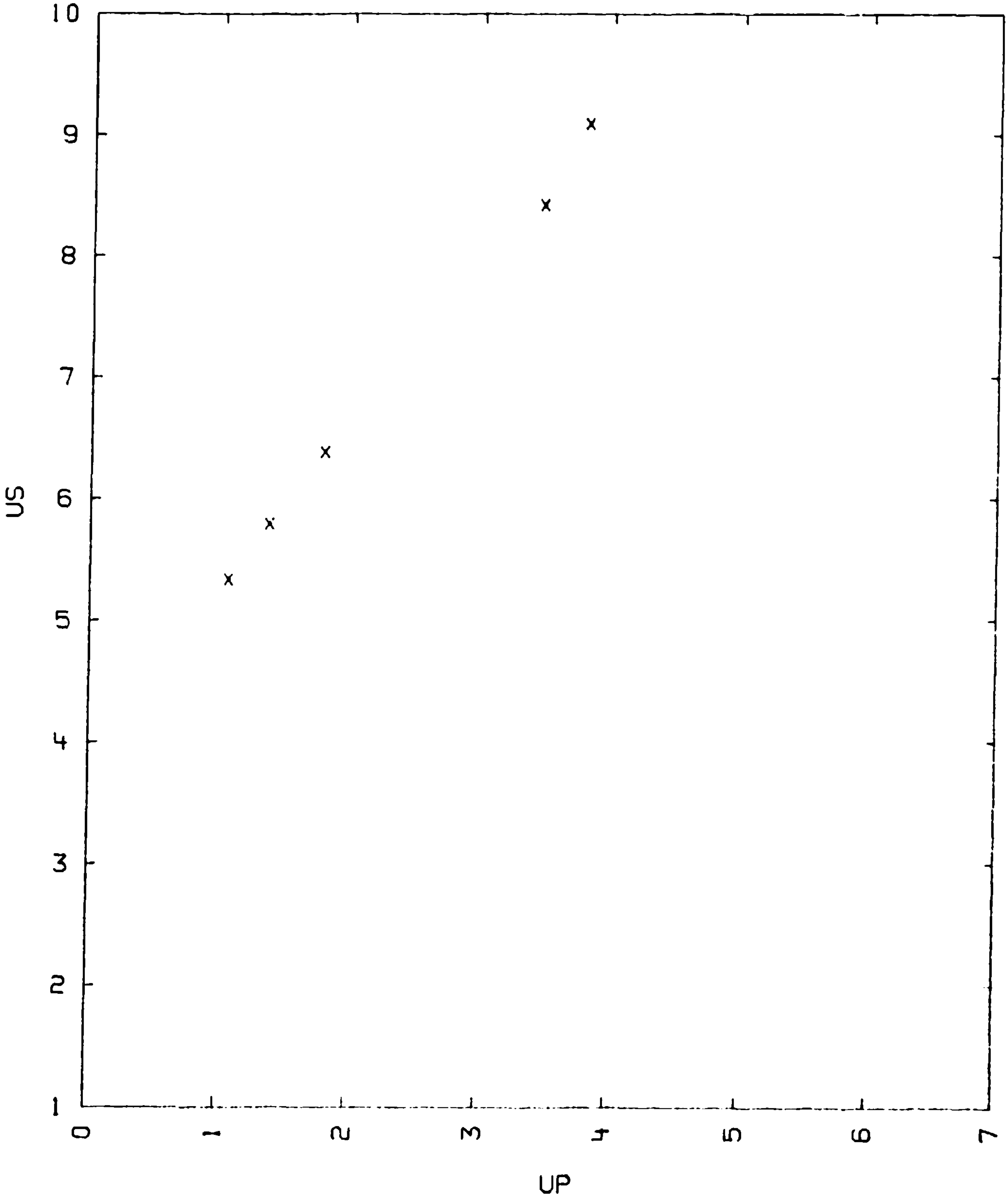
COMMENTS:

1) SOURCE: JONES, A. H., ISBELL, W. M. AND MAIDEN C. J.
JOURNAL OF APPLIED PHYSICS, VOL.37, P.3493 (1966)
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION METHOD A
STANDARD MATERIAL FANSTEEL 77.
3) THE DRIVER PLATES WERE ACCELERATED BY MEANS OF A LIGHT GAS GUN.
4) THE DRIVER PLATE VELOCITY AND SPATIAL ORIENTATION WAS MEASURED USING TWO-PULSE X-RAY STATIONS PRIOR TO IMPACT. THE X-RAY EXPOSURES TIMES WERE 30 NSEC, AND THE INTERVAL TIME BETWEEN X-RAY PULSES WAS MEASURED ON A 100-MC/SEC. COUNTER.
5) FOR BOTH THE IMPACT VELOCITY AND SHOCK VELOCITY THE MEASURED EXPERIMENTAL ERROR IS WITHIN 1 PERCENT.

TABLE I

FANSTEEL 77 (TUNGSTEN ALLOY)

53--39--36---2



53--39--36---3
FANSTEEL

W	89.9 - 90.1	WT	PERCENT
CU	3.2 - 4.4	-	-
NI	5.9 - 6.3	-	-

VO = 0.0588 CC/G   CI = 5.049 KM/SEC   CO = 3.912 KM/SEC
CS = 2.765 KM/SEC

IN THE TABLE BELOW, RHOO IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, PRESSURE IN KBARS, WF IS WEIGHTING FACTOR USED IN FIT AND IMPACTOR MATERIAL IS FANSTEEL.

TABLE

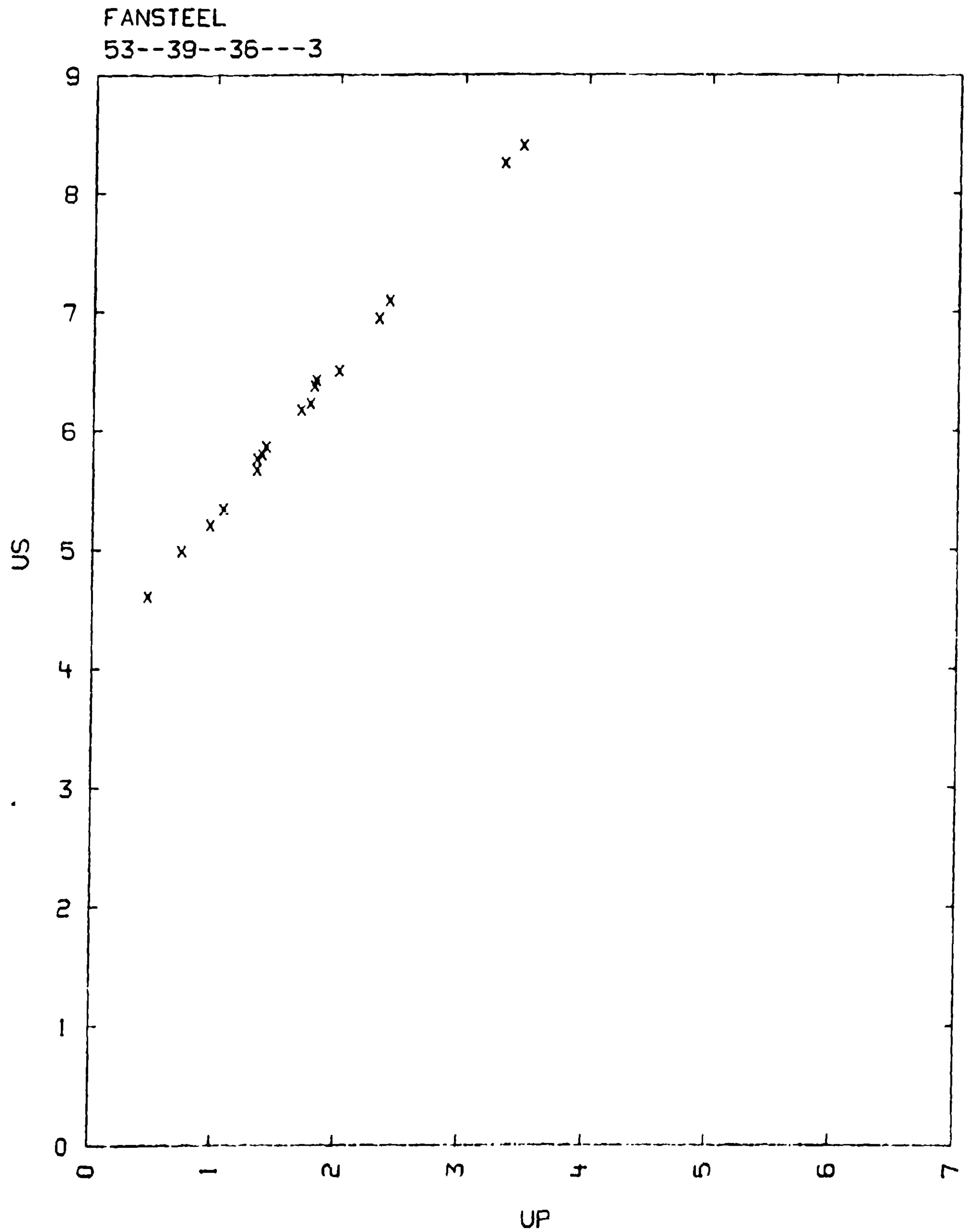
SAMPLE						IMPACTOR
RHOO	US	UP	P	V/VO	WF	U
17.01	4.599	0.453	0.354	.9015	3	0.906
17.01	4.978	0.740	0.627	.8514	1	1.478
17.01	5.194	0.976	0.862	.8121	3	1.952
17.01	5.336	1.076	0.977	.7984	1	2.152
17.01	5.661	1.344	1.294	.7626	3	2.689
17.01	5.756	1.344	1.316	.7665	3	2.689
17.01	5.786	1.387	1.365	.7603	2	2.774
17.01	5.855	1.425	1.419	.7566	3	2.849
17.01	6.163	1.706	1.788	.7232	3	3.413
17.01	6.221	1.774	1.877	.7148	1	3.548
17.01	6.365	1.809	1.959	.7158	3	3.618
17.01	6.412	1.824	1.989	.7155	1	3.648
17.01	6.490	1.997	2.205	.6923	2	3.994
17.01	6.939	2.329	2.749	.6644	1	4.657
17.01	7.082	2.405	2.897	.6604	3	4.809
17.01	8.239	3.323	4.520	.6077	1	6.646
17.01	8.390	3.468	4.949	.5867	1	6.936

US = 4.008 + 1.262*UP KM/SEC
SIG US = 0.021 KM/SEC

COMMENTS:

1) SOURCE: ISBELL, W.M., SHIPMAN, F.H. AND JONES A.H.
HUGONIOT EQUATION OF STATE MEASUREMENTS TO FIVE MEGABARS
REPORT MSL-68-13 (DECEMBER 1968)
MATERIALS AND STRUCTURES LABORATORY
GENERAL MOTORS TECHNOLOGY CENTER, WARREN, MICHIGAN 48090
2) EXPERIMENTAL TECHNIQUE: A
DATA REDUCTION TECHNIQUE: A
3) IMPACTOR VELOCITY IS ESTIMATED IN ENTRY 2. THE UNCERTAINTY = UP IS THEREFORE .019 KM/SEC UNCERTAINTIES IN US AND U ARE NORMALLY 0.5 AND 0.05 PERCENT
4) ALSO MEASURED WERE YIELD STRENGTH 5.86 KBARS
ULTIMATE TENSILE STRENGTH 6.76 KBARS
POISSON RATIO 0.286

TABLE I



53-23--36---1
ELKONITE TC-10 (TUNGSTEN CARBIDE - COPPER MIXTURE)

TUNGSTEN CARBIDE	W-C	58.0 WT PERCENT
COPPER	CU	42 WT PERCENT

V0 = 0.0857 CC/G   CL = 5.43 KM/SEC   C0 = 4.23 KM/SEC
V01 = 0.08403 CC/G   CS = 2.95 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
11.670	4.13	0.20	96.	0.9516	CU	4.27
11.660	4.30	0.22	110.	0.9488	CU	4.31
11.670	4.36	0.28	142.	0.9358	CU	4.41
11.460	4.33	0.30	149.	0.9307	CU	4.45
11.690	4.65	0.43	234.	0.9075	CU	4.67
11.670	4.93	0.62	357.	0.8742	CU	4.98
11.680	5.42	0.94	595.	0.8266	CU	5.51
11.670	6.09	1.38	981.	0.7734	CU	6.23
11.680	6.61	1.72	1328.	0.7398	CU	6.79
11.660	6.96	1.95	1582.	0.7198	CU	7.16
11.660	7.38	2.26	1945.	0.6938	CU	7.65

US = 4.057 + 1.479*UP - 0.428/(1+UP)**5 KM/SEC
SIG US = 0.041 KM/SEC

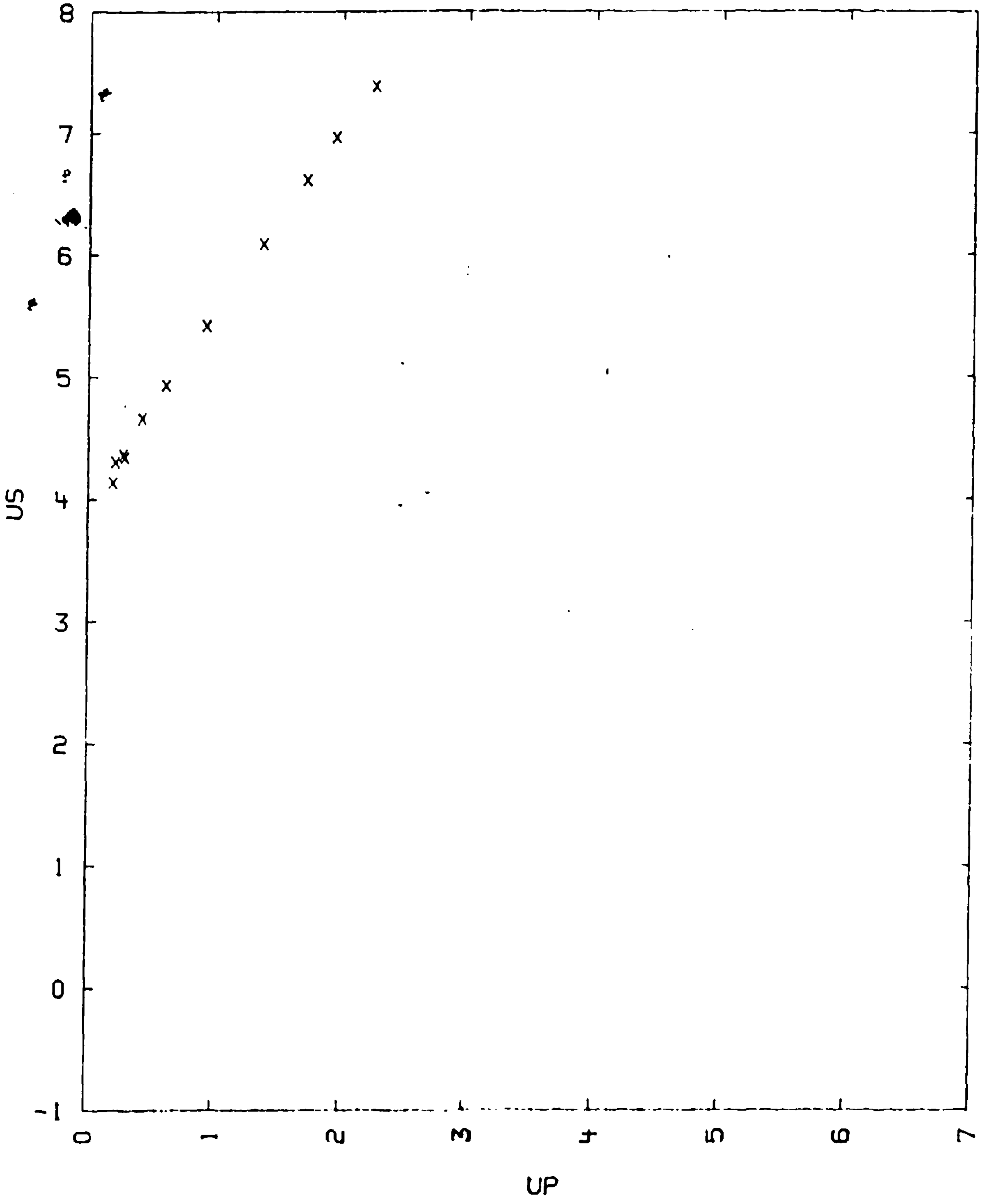
COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES. HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B
3) V01 FROM IDEAL MIXTURE THEORY.
V01(W-C) = 0.063812 CC/C FROM WYCKOFF, CRYSTAL STRUCTURES (JOHN WILEY AND SONS, N.Y., 1963), VOL. 1 RHOO(CU) = 8.93 G/CC.
4) THE SAMPLES CONSIST OF SINTERED W-C INFILTRATED WITH CU.
5) V(DP/DE) = 1.74

TABLE I

ELKONITE TC-10 (TUNGSTEN CARBIDE - COPPER MIXTURE)

53-23--36---1



08--55--58---1
MULBERRY

U	90.0	WT	PERCENT
MB	7.5 + OR - 0.5	-	-
ZR	2.5 + OR - 0.5	-	-

V0 = .0603 - 0.0614 CC/G CL = 2.92 KM/S C0 = 2.57 KM/S
V01= .0602 - 0.0606 CC/G CS = 1.19 KM/S

IN THE TABLE BELOW VELOCITIES ARE IN KM/S, PRESSURE IN KILOBARS AND D MM. EXP. INDICATES THE EXPERIMENTAL TECHNIQUE AND MAT IS THE STANDARD BASEPLATE OR IMPACTOR MATERIAL.

TABLE

SAMPLE								STANDARD	
RHO0	US	UP	UFS	P	V/V0	D	EXP	MAT	P
16.59	3.00	.03		14.	0.9906	6.4	12	STU	14.
16.59	2.94	.09		46.	0.9679	6.4	12	STU	46.
16.59	2.95	.16		77.	0.9467	6.4	12	STU	77.
16.59	3.04	.16		81.	0.9472	6.4	12	STU	81.
16.59	3.04	.25		126.	0.9178		A	STU	126.
16.59	3.16	.30		157.	0.9052		A	STU	157.
16.59	3.51	.35		204.	0.9003		A	STU	204.
16.35	3.0	.115	.226	54.	0.9633	6.4	C3	PB	40.
16.49	2.97	.115	.248	54.	0.9629	6.4	C3	PB	40.
16.29	3.06	.113	.272	54.	0.9646	6.4	C3	PB	39.
16.41	3.02	.113	.280	54.	0.9639	6.4	C3	PB	39.
16.36	3.06	.113	.290	54.	0.9647	6.4	C3	PB	40.
16.44	3.07	.113	.304	54.	0.9651	6.4	C3	PB	40.
16.44	3.04	.113	.276	54.	0.9645	6.4	C3	PB	40.
16.38	3.00	.150	.290	73.	0.9505	6.4	C3	PB	54.
16.39	3.01	.150	.276	73.	0.9508	6.4	C3	PB	54.
16.24	3.04	.195	.368	98.	0.9347	6.4	C3	PB	73.
16.28	3.03	.195	.394	98.	0.9344	6.4	C3	PB	73.
16.40	3.02	.20	.460	102.	0.9318	6.4	C3	PB	75.
16.45	3.01	.20	.480	102.	0.9316	6.4	C3	PB	75.
16.44	3.05	.2	.458	102.	0.9333	6.4	C3	PB	75.
16.32	3.04	.213	.444	105.	0.9304	12.7	C3	PB	79.
16.40	2.98	.195	.490	97.	0.9334	25.4	C3	PB	72.
16.42	3.05	.233	.432	117.	0.9234	6.4	C3	PB	86.
16.43	3.08	.233	.424	117.	0.9249	6.4	C3	PB	86.
16.48	3.12	.275	.568	141.	0.9121	6.4	C3	PB	106.
16.43	3.14	.275	.540	141.	0.9130	6.4	C3	PB	106.
16.43	3.15	.273	.526	142.	0.9129	6.4	C3	PB	107.
16.29	3.15	.273	.528	142.	0.9121	6.4	C3	PB	107.
16.39	3.02	.285	.558	145.	0.9030	12.7	C3	PB	114.
16.44	3.15	.275	.544	142.	0.9130	6.4	C3	PB	107.
16.44	3.13	.275	.548	142.	0.9118	6.4	C3	PB	107.
16.34	3.10	.230	.470	117.	0.9255	25.4	C3	PB	93.
16.44	3.28	.44	.842	236.	0.8666	6.4	C3	BR	200.
16.49	3.09	.44	.844	237.	0.8495	6.4	C3	BR	200.
16.45	3.53	.563	1.146	327.	0.8405	6.4	C3	BR	252.

MULBERRY

RHOO	US	UP	UFS	P	V/VO	D	EXP	MAT	P
16.48	3.54	.563	1.154	327.	0.8417	6.4	C3	BR	252.
16.59	3.30	.292	.610	160.	0.9114	6.4	B	BR	131.
16.58	3.53	.614		360.	0.8258	6.4	B	BR	300.
16.58	3.51	.653		380.	0.8140	6.4	B	BR	300.
16.59	3.99	.995	1.92	658.	0.7509	6.4	B	BR	542.
16.58	4.26	1.11	2.18	783.	0.7378	6.4	B	BR	642.
16.56	4.82	1.51	3.10	1200.	0.6881	6.4	B	BR	965.
16.56	5.59	2.03	4.22	1880.	0.6367	6.4	B	BR	1500.

US =

COMMENTS:

1) SOURCE: GUST W.N. AND ROYCE E.B.
SHOCK COMPRESSION OF THE STAINLESS URANIUM ALLOY MULBERRY
LAWRENCE LIVERMORE LABORATORY REPORT UCRL 50888 (1970)
A KUSBOV - S DIVISION
LAWRENCE LIVERMORE LABORATORY REPORT STN 183 (1968)

2) EXPERIMENTAL TECHNIQUE AS SHOWN IN TABLE.
DATA REDUCTION METHODS: C, A, B, B FOR THE EXP. METHODS 12, A, C3, B RESPECTIVELY.

3) THE SAMPLE THICKNESS USED FOR UFS IN THE B EXPERIMENTS WAS 3.2 MM.

4) THE VALUES OF CL, CS AND CO ARE AVERAGES OF 34 MEASUREMENTS ON THE SAMPLES THAT ALSO GAVE THE DATA CORRESPONDING TO EXP. = 12 AND C3. SIG. CL = .0374 KM/SEC, SIG. CS = .0242 KM/SEC AND SIG. CO = .0365.

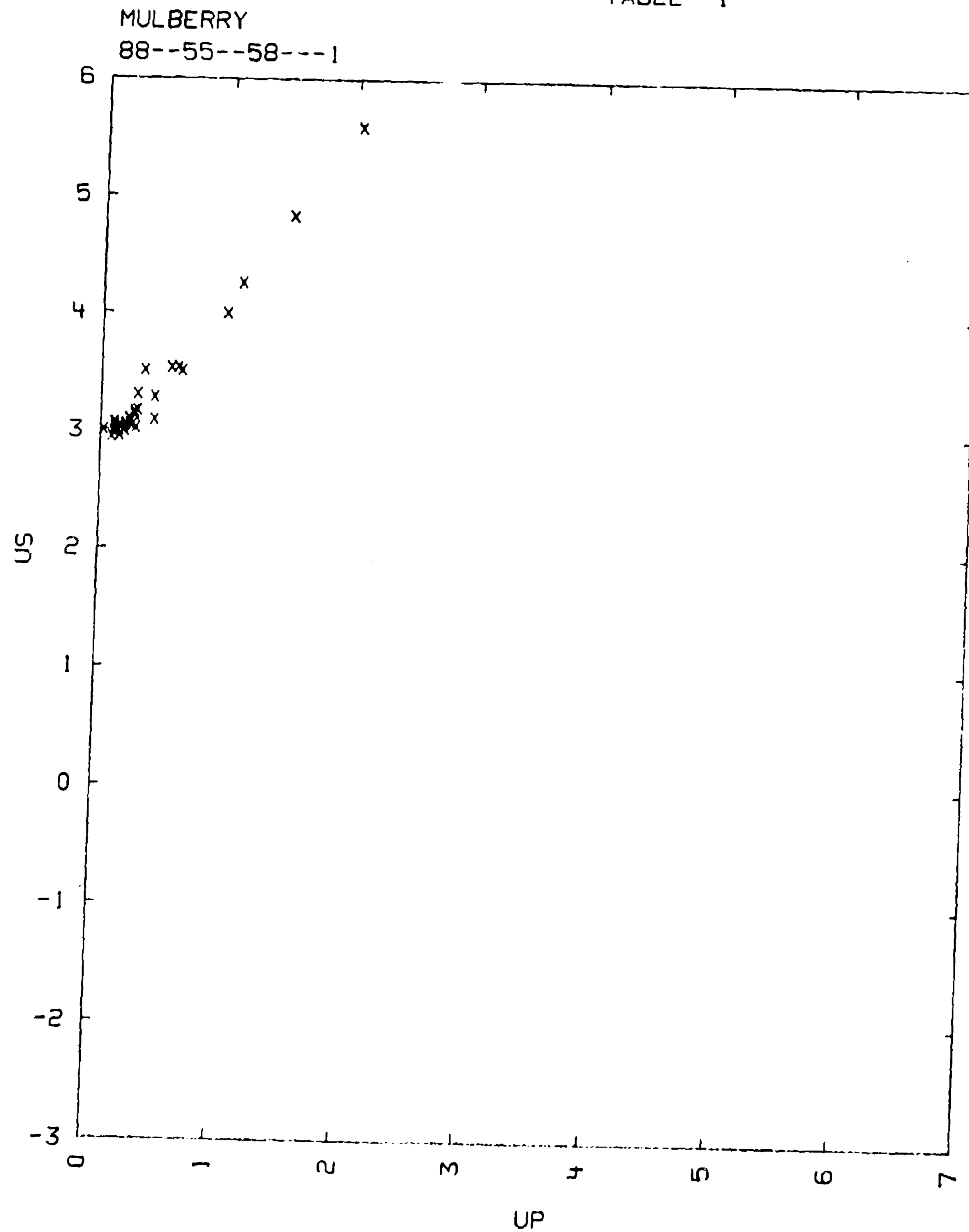
5) THE CO VALUE WITH 1/V(DV/DT)P = 3.9E-5 KM/SEC AND (DH/DT)P = CP = .04 CAL/G. YIELD A GRUNEISEN CONSTANT = 1.7 (C.A.W. PETERSON AND W.E. ELKINGTON UCRL 14724) LARGER VALUES (1.8 - 2.0) HAVE BEEN CALCULATED (M. GUINAN ETAL, PRIVATE COMM.)

6) VOI IS CALCULTED FROM THE LATTICE CONSTANTS OF MATERIAL QUENCHED FROM 800 DEG. C. AND ANNEALED FOR 2 HRS AT 150 DEG. C., TO YIELD THE B.C. TETRAGONAL PHASE (GAMMAO) (H.L. YAKEL - J. NUCL MATS. V33, P. 286 (1969)

7) DATA SCATTER MAY BE DUE IN PART TO PRESENCE OF VARIABLE AMOUNTS OF AN ALPHA PHASE AND POSSIBLE INTERNAL STRAINS. DATA OBTAINED WITH METHOD 12, A AND B ARE FROM A SEPARATE BATCH OF SAMPLES. NOTE DENSITY DIFFERENCE.

8) A NARROW ELASTIC-PLASTIC DOUBLE WAVE REGION IS SUGGESTED BY SOME OF THE HIGHER DENSITY SAMPLES AND CONFIRMED BY TWO MANGANIN WAVE PROFILES (HEL = 70-80KB J.A. CHAREST REPORT E.G.G. 1183-2245, UCRL 13473 (1970))

TABLE I



92--29---1
LOCKALLOY (BERYLLIUM ALLOY)

BE 68 PERCENT BY WEIGHT
AI 32 PERCENT -

VO = 0.480 CC/G
VOI = 0.4769 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS.

TABLE

----------- SAMPLE	-----------------				BASE PLATE
RHOO	US	UP	P	V/VO	P
2.090	10.04	2.55	535	0.746	721
2.090	7.33	0.53	80	0.928	85

US =

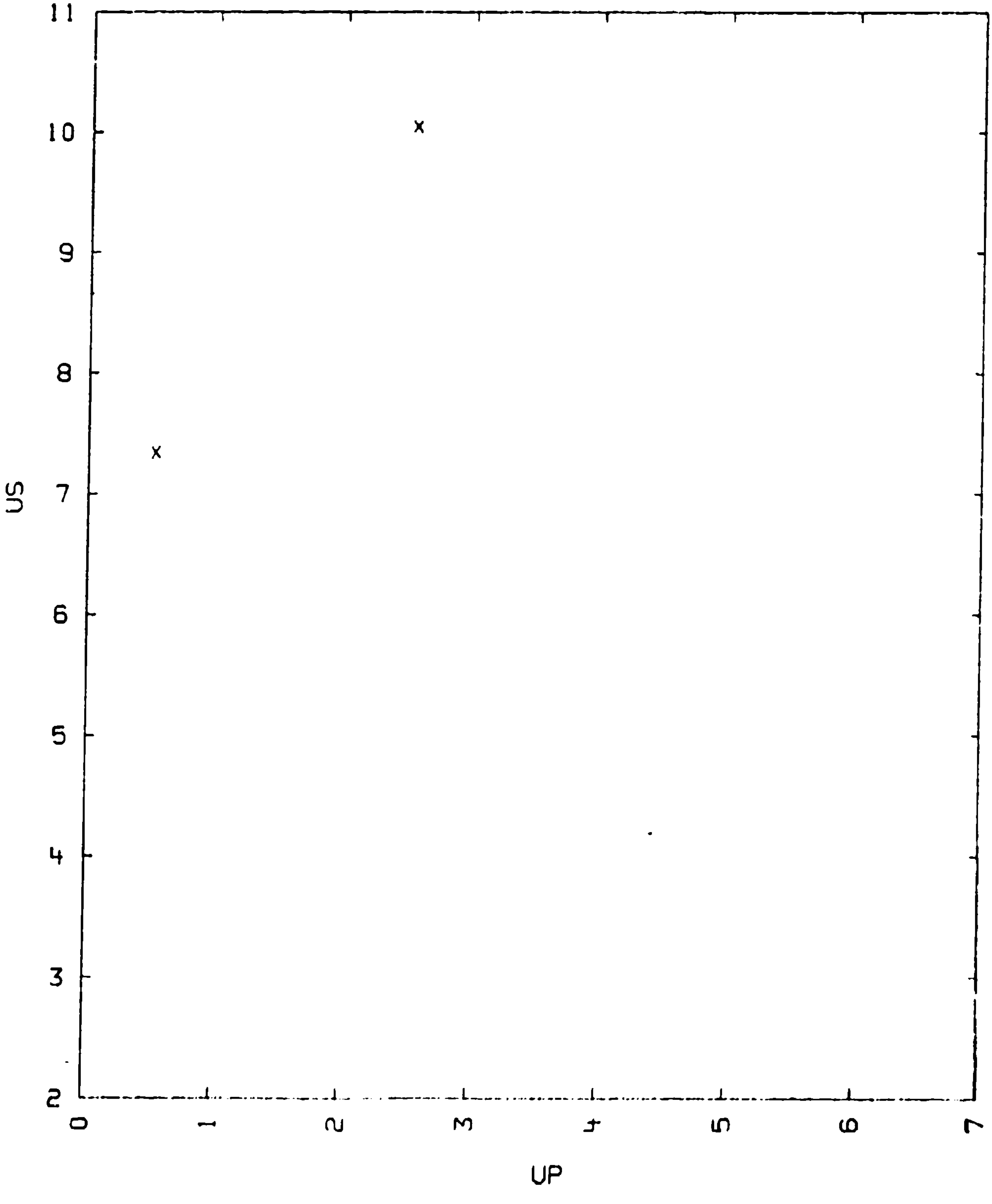
COMMENTS:

1) SOURCE: COMPILER
L.R.L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
2) EXPERIMENTAL TECHNIQUE B. (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) THE VALUE OF VOI WAS CALCULATED BY ASSUMING ADDITIVITY OF THE VOLUMES OF COMPONENTS. THE VOLUMES OF THE COMPONENTS WERE OBTAINED FROM A. TAYLOR AND BRENDA J. KAGLE, CHRYSTALLOGRAPHIC DATA ON METAL AND ALLOY STRUCTURES (DOVER PUBLICATIONS, INC., NEW YORK, N. Y., 1963).
4) LOCKALLOY WAS MANUFACTURED BY LOCKHEED MISSLES AND SPACE CO.
5) PHYSICAL PROPERTIES:

SPECIFIC HEAT	0.39	CAL/GM/DEG K
THERMAL CONDUCTIVITY	0.49	(CAL)/CM SEC DEG K)
THERMAL EXPANSION	16.6 E-6	PER DEG K (25-145 DEG C)

TABLE I

LOCKALLOY (BERYLLIUM ALLOY)
92--29---1



93--22--34---1
MAGNESIUM-BISMUTH ALLOY

MG-BI-CD

MG 40 PERCENT BY WEIGHT
BI 40 PERCENT -
CD 20 PERCENT -

VO = 0.291 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS.

TABLE

SAMPLE						BASE PLATE
RHOO	US	UFS	UP	P	V/VO	P
3.490	4.54	1.99	1.00	158	0.779	172
3.456	4.86	2.69	1.32	221	0.729	240
3.379	6.05	3.16	1.54	314	0.746	317

US = 1.72 + 2.67 UP KM/SEC
SIGMA US = 0.467 KM/SEC

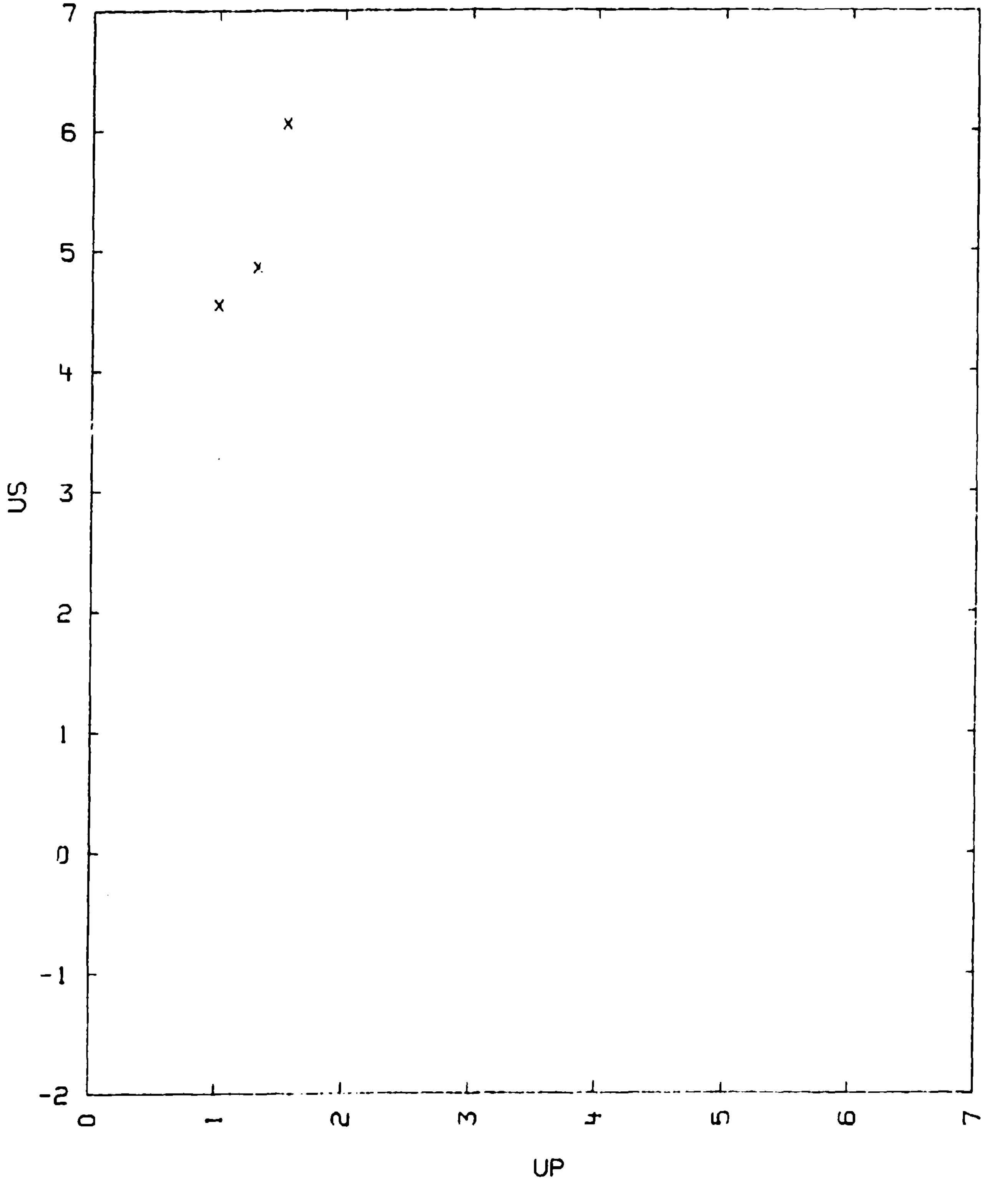
COMMENTS:

1) SOURCE: COMPILER
L.R.L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
2) EXPERIMENTAL TECHNIQUE B. (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) SOME OF THE VARIATION IN RHOO MAY BE DUE TO A LACK OF UNIFO[illegible]TY IN THE ORIGINAL BATCH FROM WHICH THE SAMPLES WERE DERIVED.
THE ABOVE COMPOSITION OF THE ALLOY IS THE AVERAGE BATCH COMPOSITION.
4) THIS ALLOY IS PROBABLY A TWO PHASE SYSTEM:
A) A SOLUTION OF CD IN MG
B) A MG3-BI2 PHASE (F. FULTON, METALLURGY L.R.L.)

TABLE I

MAGNESIUM-BISMUTH ALLOY

93--22--34---1



93-24-1--41-24-1---1
DUNITE TWIN SISTERS MT. (SILICATE ROCK)

OLIVENE:			92.5 VOLUME PERCENT		
FORSTERITE	MG2-SI-04	81		-	-
FAYALITE	FE2-SI-04	11		-	-
PYROXENE:			7	-	-
ENSTATITE	MG2-SI2-06	6.0		-	-
FERROSILITE	FE2-SI2-06	1.0		-	-
SERPENTINE	MG6-SI4-010(0-H)8		0.5	-	-

V0 = 0.301 CC/G   CL = 8.55 KM/SEC.
V01 = 0.298 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE SAMPLE HOLDER AND STANDARD MATERIAL.

TABLE

RHO0	US	UP	P	V/V0	US(ST)
3.32	7.31	0.76	185.	0.896	6.54
3.32	7.32	0.78	190.	0.893	6.56
3.32	7.27	0.78	189.	0.893	6.56
3.32	7.35	0.84	205.	0.886	6.64
3.32	7.32	0.84	204.	0.885	6.64
3.32	7.29	0.84	204.	0.885	6.64
3.32	7.62	1.05	265.	0.862	6.95
3.32	7.48	1.06	264.	0.858	6.97
3.32	7.61	1.09	276.	0.857	7.02
3.32	7.57	1.11	280.	0.853	7.04
3.32	7.59	1.22	307.	0.839	7.18
3.32	7.69	1.25	319.	0.837	7.23
3.32	7.94	1.54	405.	0.806	7.64
3.32	8.00	1.56	415.	0.805	7.68
3.32	7.93	1.57	412.	0.802	7.67
3.32	7.87	1.64	429.	0.792	7.76
3.32	8.10	1.65	442.	0.796	7.79
3.32	8.10	1.65	442.	0.796	7.79
3.32	8.11	1.75	472.	0.784	7.93
3.32	8.15	1.98	536.	0.757	8.23
3.32	8.13	2.01	542.	0.753	8.26
3.32	8.17	2.12	576.	0.741	8.41
3.32	8.22	2.22	607.	0.730	8.53
3.32	8.24	2.23	610.	0.729	8.54
3.32	8.22	2.23	609.	0.729	8.54
3.32	8.33	2.38	657.	0.714	8.73
3.32	8.28	2.41	662.	0.709	8.77
3.32	8.31	2.42	668.	0.709	8.78
3.32	8.28	2.43	669.	0.707	8.79
3.32	8.24	2.44	668.	0.704	8.80
3.32	8.39	2.64	734	0.686	9.05
3.32	8.31	2.65	730	0.682	9.05
3.32	8.75	2.86	831	0.673	9.38
3.32	8.66	2.90	832	0.667	9.40

DUNITE TWIN SISTERS MT. (SILICATE ROCK)

RHOO	US	UP	P	V/VO	US(ST)
3.32	8.73	2.91	844	0.667	9.44
3.32	8.69	2.93	844	0.663	9.45
3.32	8.77	2.95	858	0.664	9.49
3.32	8.75	2.95	857	0.663	9.49
3.32	9.15	3.10	941	0.661	9.73
3.32	9.12	3.10	940	0.660	9.73
3.32	9.25	3.28	1007	0.646	9.56
3.32	9.55	3.37	1070	0.647	10.13
3.32	9.45	3.39	1063	0.641	10.12
3.32	9.49	3.39	1068	0.642	10.13
3.32	9.69	3.49	1123	0.641	10.28

US = 6.65 + 0.825*UP KM/SEC. FOR UP FROM 0.7 TO 1.65 KM/SEC.
SIGMA US = 0.06 KM/SEC.

US = 7.63 + 0.268*UP KM/SEC. FOR UP FROM 1.65 TO 2.5 KM/SEC.
SIGMA US = 0.03 KM/SEC.

US = 4.140 + 1.582*UP KM/SEC. FOR UP FROM 2.6 TO 3.5 KM/SEC.
SIGMA US = 0.07 KM/SEC.

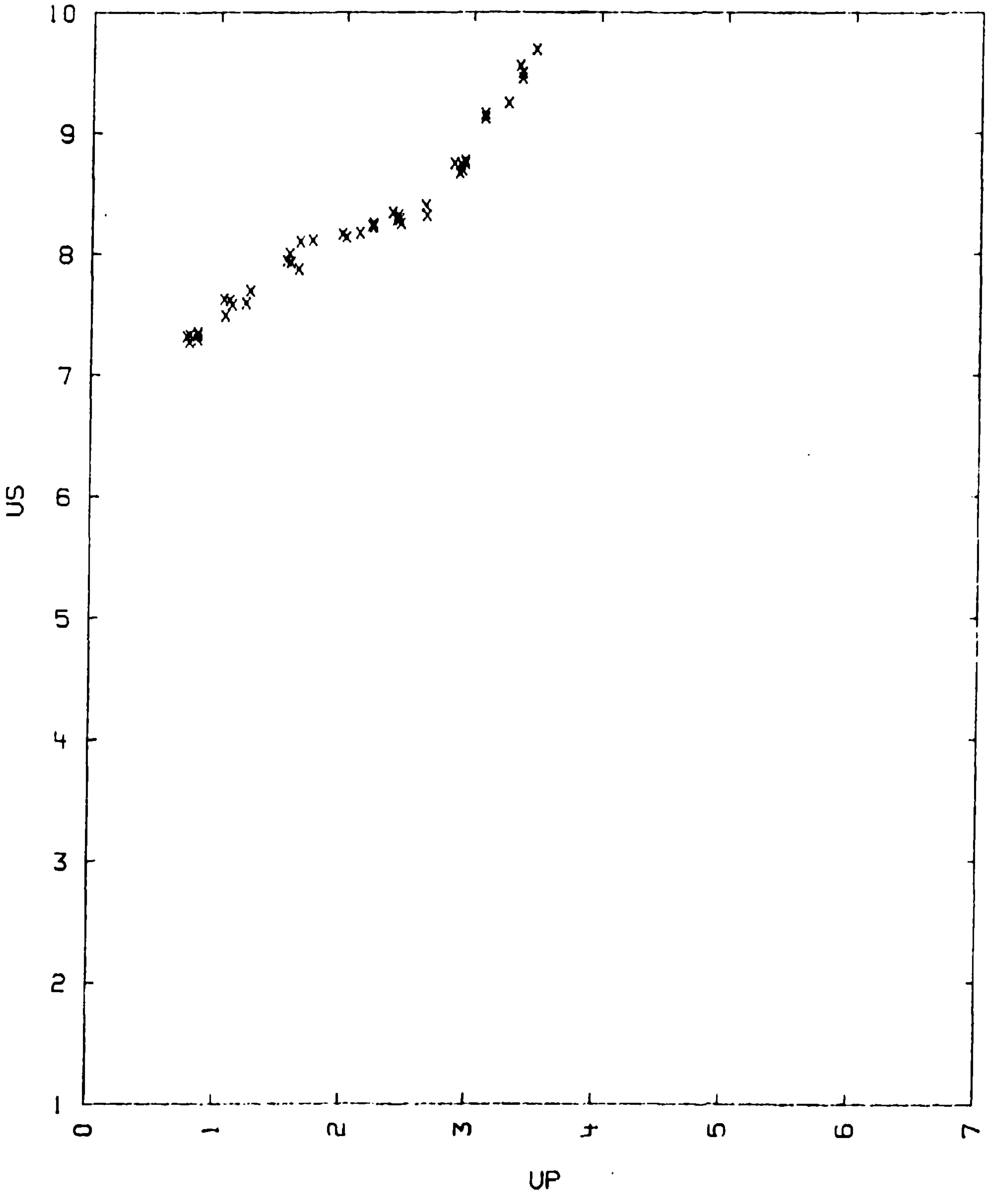
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) VOI WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED IN CRYSTAL DATA DETERMINATIVE TABLES (AMERICAN CRYST. ASSN. 1963) 2ND ED., AND ASSUMING A DENSITY OF 2.2 AND 3.3 FOR SERPENTINE AND THE REMAINING 0.5 PERCENT OF MATERIAL RESPECTIVELY
4) THE MODAL ANALYSIS OF THESE SAMPLES WHICH WERE OBTAINED FROM BIRCH WAS TAKEN FROM : F. BIRCH, J. GEOPHYS. RES., NO. 65, P 1083, (1960)
5) FURTHER WORK IS IN PROGRESS.

TABLE I

DUNITE TWIN SISTERS MT. (SILICATE ROCK)

93-24-1--41-24-1---1



93-24-1--41-24-1---2
BRONZITITE, BUSHVELD COMPLEX, TRANSVAAL (SILICATE ROCK)

PLAGIOCLASE:			4	VOL.	PERCENT
ANORTHITE	CA-AL2-SI2-O8	3.2		-	-
ALBITE	NA-AL-SI3-O8	0.8		-	-
PYROXENE:			92	-	-
ENSTATITE	MG2-SI2-O6	82.8		-	-
FERROSILITE	FE2-SI2-O6	9.2		-	-
HORNBLENDE	CA-NA(MG,FE)4(AL,FE,TI)3-SI8-O22(O,OH)2		2	-	-

V0 = 3.03 CC/G CL = 7.7 KM/SEC
V0I = 3.121 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE SAMPLE HOLDER AND STANDARD MATERIAL.

TABLE

RHO0	US	UP	P	V/V0	US(ST)
3.30	6.74	0.52	116.	0.923	6.16
3.30	6.68	0.80	176.	0.880	6.54
3.30	6.98	1.11	254.	0.841	6.97
3.29	7.31	1.64	394.	0.776	7.68
3.30	7.31	1.64	397.	0.776	7.69
3.30	7.35	1.70	413.	0.769	7.76
3.30	7.57	2.20	551	0.708	8.41
3.29	7.92	2.50	649	0.685	8.80
3.30	8.65	2.93	836	0.661	9.44
3.30	8.90	3.14	923	0.647	9.73

US = 4.322 + 1.462*UP KM/SEC. FOR UP FROM 2.2 TO 3.2 KM/SEC.
SIGMA US = 0.056 KM/SEC.

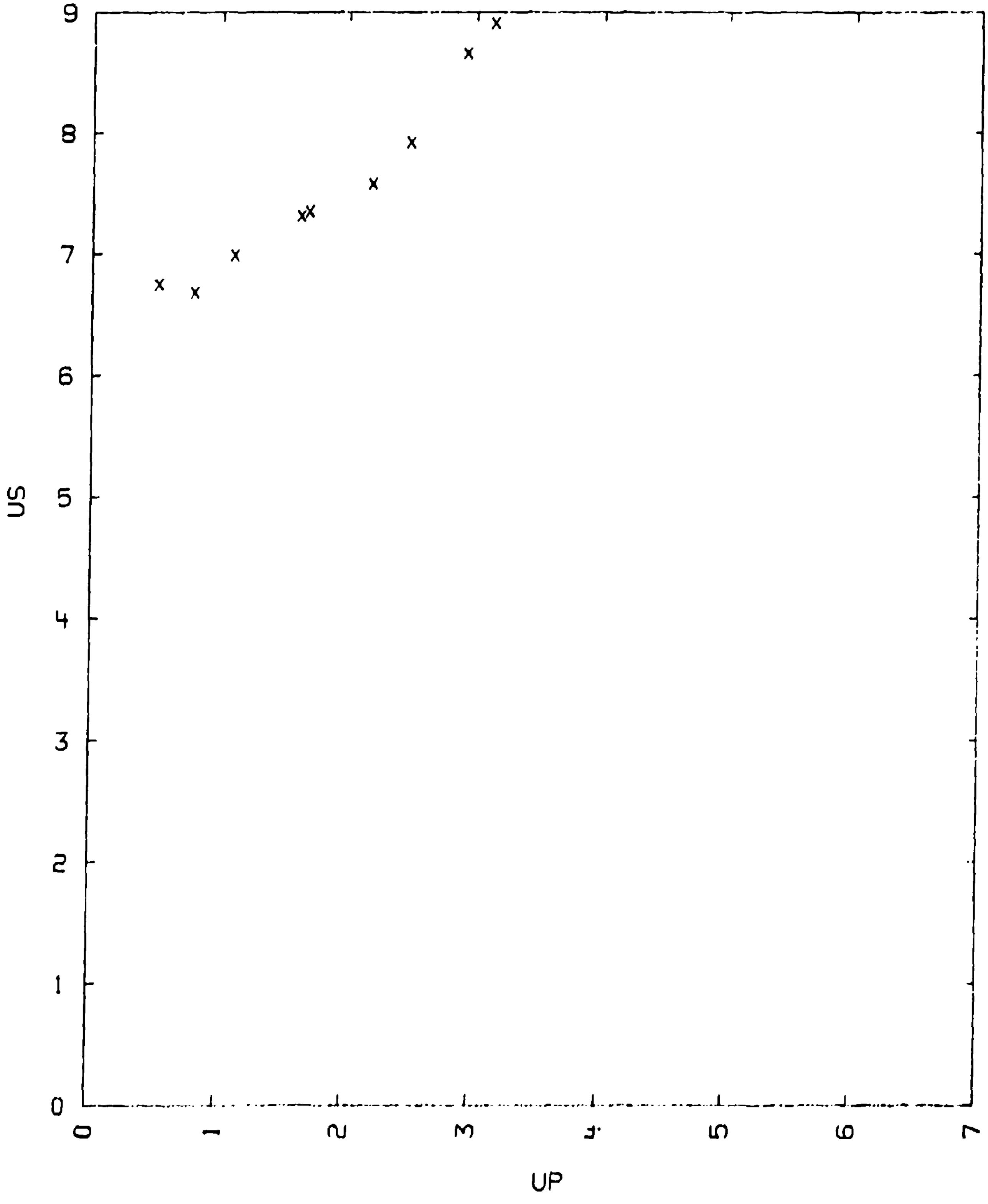
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) V0I WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED IN CRYSTAL DATA DETERMINATIVE TABLES (AMERICAN CRYST. ASSN. 1963) 2ND. ED., AND A HORNBLENDE DENSITY OF 3.20 G/CC
4) THE MODAL ANALYSIS OF THESE SAMPLES (OBTAINED THROUGH F. BIRCH), WAS TAKEN FROM: F. BIRCH, J. GEOPHYS. RES., VOL. 65, P. 1083 (1960)
5) FURTHER WORK IS IN PROGRESS.

TABLE I

BRONZITITE, BUSHVELD COMPLEX, TRANSVAAL (SILICATE

93-24-1--41-24-1---2



93-24-1--41-24-1---3
OLIVINITE I (SILICATE ROCK)

OLIVINE:		90	VOLUME	PERCENT
FORSTERITE MG2-SI-O4	81		-	-
FAYALITE FE2-SI-O4	9		-	-
BIOTITE K-(MG,FE)3AL-SI3-O10-(OH)2		7	-	-
TITANOMAGNETITE		3	-	-

V0 = 0.302 CC/G
V0I= 0.298 CC/G

THE TABLE LISTS DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KBRS. PLEX INDICATES PLEXIGLAS, AL-ALUMINUN, MG-MAGNESIUM AND FE-IRON.

TABLE

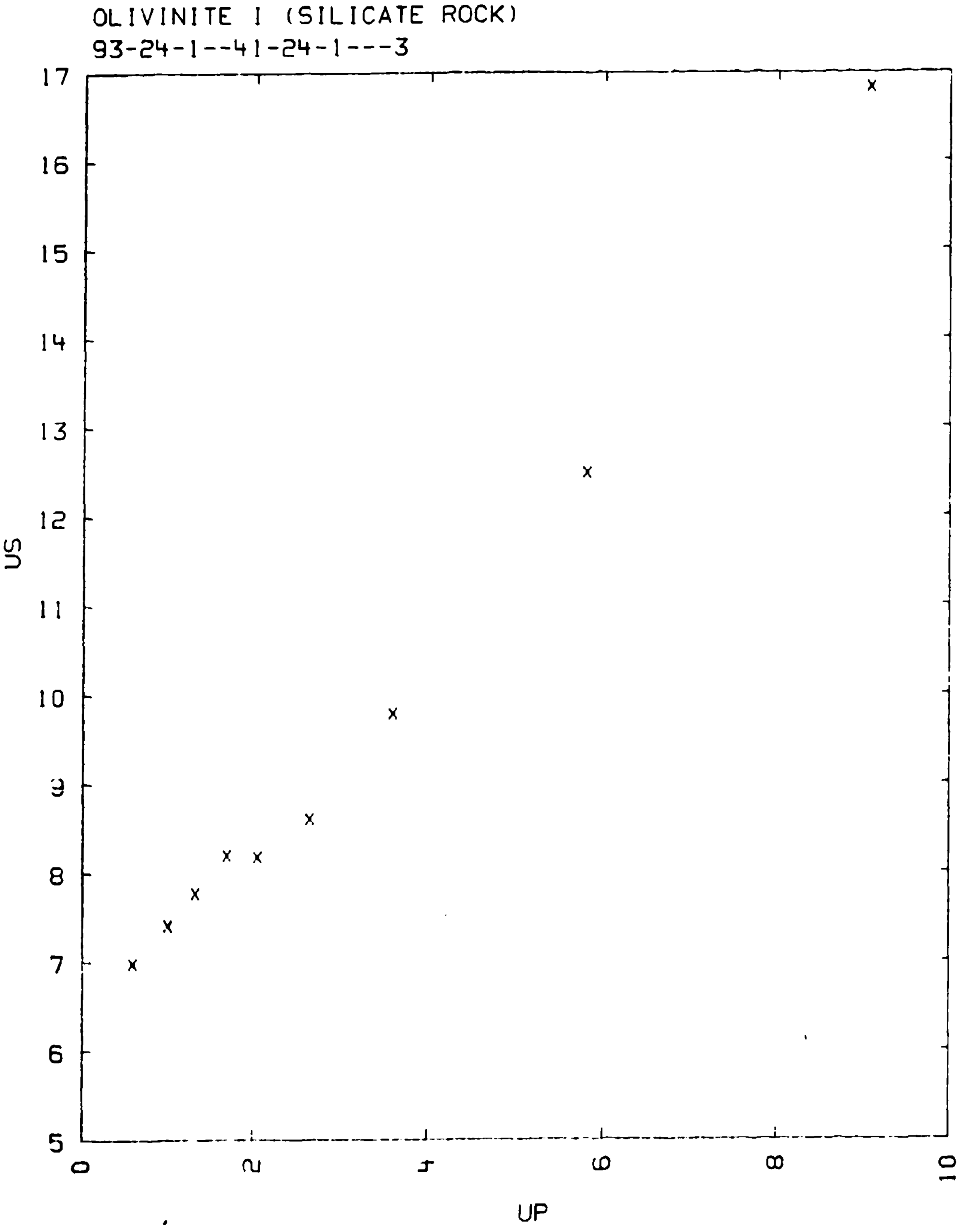
SAMPLE					STANDARD	
RHO0	US	UP	P	V/V0	MTRL	UP
3.31	6.98	0.59	136	0.915	AL	0.69
-	7.40	1.00	245	0.865	AL	1.14
-	7.77	1.33	342	0.829	AL	1.50
-	8.60	2.65	755	0.692	AL	2.82
-	8.19	1.70	461	0.792	PLEX	3.05
-	8.17	2.04	551	0.750	MG	2.79
-	9.78	3.59	1162	0.633	FE	2.92
-	12.48	5.81	2400	0.534	FE	4.56
-	16.83	9.07	5050	0.461	FE	7.11

US = 5.08 + 1.287*UP KM/SEC, FOR UP FROM 2.2 TO 9.5 KM/SEC.

COMMENTS:

1) SOURCE: TRUNIN, R. F., GON'SHAKOVA, V. I., SIMAKOV, G. V. AND GALDIN, N. E.
IZV. AKADEMII NAUK SSSR, FIZIKA ZEMLI, VOL. 9, 1965, P. 1-12.
2) EXPERIMENTAL TECHNIQUE A.
DATA REDUCTION METHOD B, (STANDARD MATERIAL INDICATED IN THE TABLE).
3) THE SHOCK VELOCITY WAS MEASURED WITH AN ACCURACY OF 1.5 PERCENT UP TO 700 KBAR AND WITH 2 PERCENT ACCURACY AT HIGHER PRESSURE.
4) A DISCONTINUITY IN THE HUGONIOT IS OBSERVED AT US = 9.2 KM/SEC.
5) VOI WAS OBTAINED FROM ASSUMED BIOTITE AND TITANOMAGNETITE DENSITIES OF 2.9 AND 5.1 G/CC RESPECTIVELY AND THE OLIVINE LATTICE PARAMETERS GIVEN IN: CRYSTAL DATA DETERMINATIVE TABLES MONOGRAPH 5 (AMERICAN CRYST. ASSN. 1963) 2ND. ED.

TABLE I


OLIVINITE I (SILICATE ROCK)
93-24-1--41-24-1---3
US
UP
17
16
15
14
13
12
11
10
9
8
7
6
5
0
2
4
6
8
10

93-24-1--41-24-1---4
PYROXINITE (ENSTATITE)(SILICATE ROCK)

HYPERSTENE:			95	VOLUME	PERCENT
ENSTATITE	MG2-SI2-O6	81		-	-
FERROSILITE	FE2-SI2-O6	14		-	-
OLIVINE:			3	-	-
FORSTERITE	MG2-SI-O4	2.7		-	-
FAYALITE	FE2-SI-O4	0.3		-	-
LABRADORITE:			2	-	-
ANORTHITE	CA-AL2-SI2-O8	1.2		-	-
ALBITE	NA-AL-SI3-O8	0.8		-	-

V0 = 0.304 CC/G
V0I= 0.3002 CC/G

THE TABLE LISTS DENSITY IN G/CC, VELOCITY IN KM/SEC AND PRESSURE IN KBARS. PLEX INDICATES PLEXIGLAS, AL -ALUMINUM, CU -COPPER AND FE -IRON.

TABLE

SAMPLE					STANDARD	
RHO0	US	UP	P	V/V0	MTRL	UP
3.29	6.86	0.60	136	0.913	AL	0.69
-	7.46	1.36	334	0.818	AL	1.50
-	8.70	2.66	761	0.694	AL	2.82
-	7.98	1.74	457	0.782	PLEX	3.05
-	7.87	2.26	584	0.713	CU	1.71
-	9.85	3.56	1154	0.639	FE	2.80
-	12.60	5.80	2400	0.5 0	FE	4.56

US = 5.30 + 1.265*UP KM/SEC, FOR UP FROM 2.3 TO 6.0 KM/SEC.

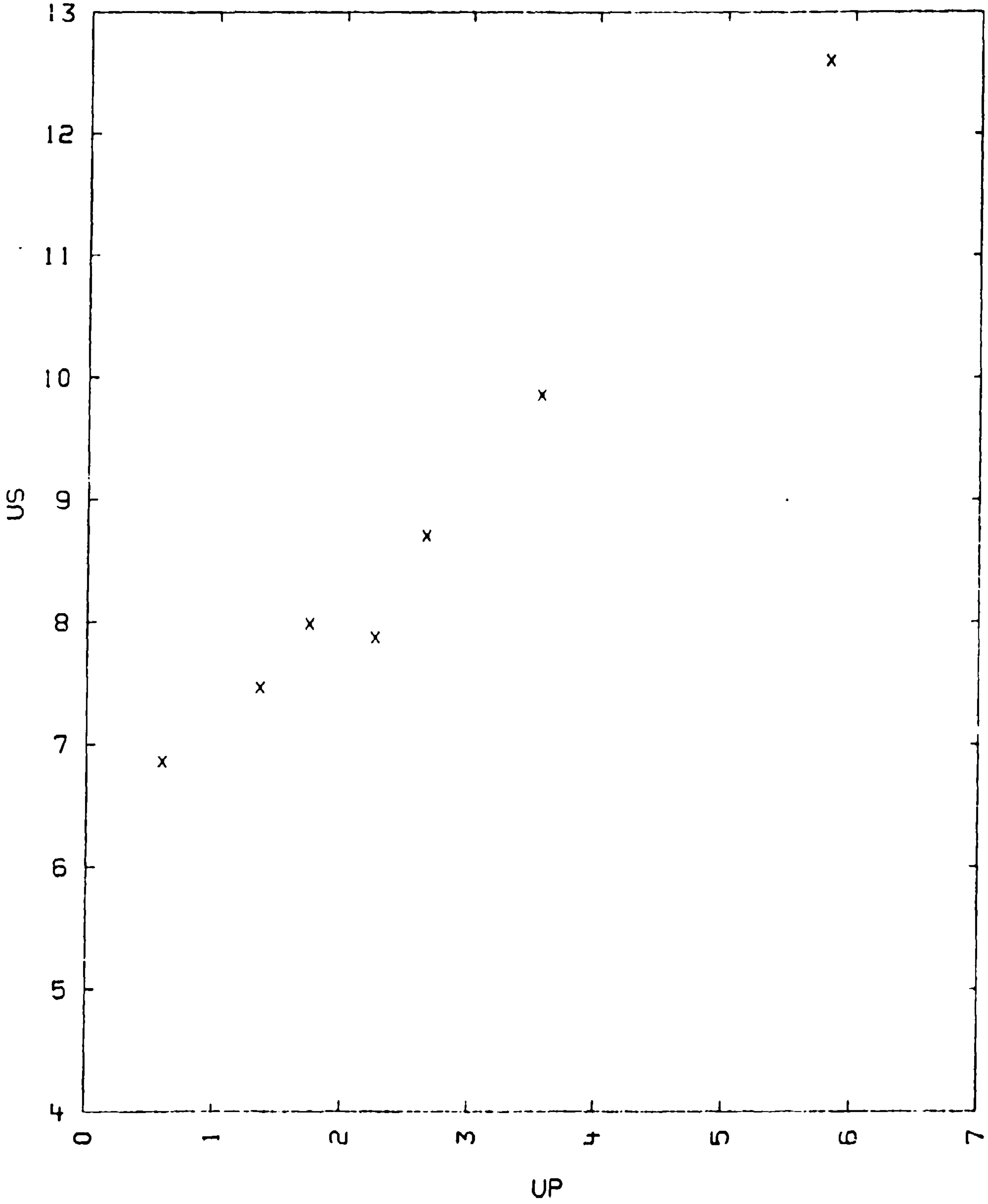
COMMENTS:

1) SOURCE: TRUNIN, R. F., GON'SHAKOVA, V. I., SIMAKOV, G. V. AND GALDIN, N. E.
IZV. AKADEMII NAUK SSSR. FIZIKA ZEMLI, VOL. 9, 1965, P. 1-12.
2) EXPERIMENTAL TECHNIQUE A.
DATA REDUCTION METHOD B, (STANDARD MATERIAL INDICATED IN THE TABLE).
3) THE SHOCK VELOCITY WAS MEASURED WITH AN ACCURACY OF 1.5 PERCENT UP TO 700 KBAR AND WITH 2 PERCENT ACCURACY AT HIGHER PRESSURE.
4) A DISCONTINUITY IN THE HUGONIOT OCCURS AT US = 7.9 KM/SEC.
5) V0I WAS OBTAINED FROM LATTICE PARAMETERS LISTED IN: CRYSTAL DATA DETERMINATIVE TABLES MONOGRAPH 5 (AMERICAN CRYST. ASSN. 1963) 2ND. ED

TABLE I

PYROXINITE (ENSTATITE)(SILICATE ROCK)

93-24-1--41-24-1---4



93-24-1--41-24-1---5
PERIDOTITE (OLIVINITE)

OLIVINE:			75	PERCENT BY VOLUME
FORSTERITE	MG2-SI-04	56		- - -
FAYALITE	FE2-SI-04	19		- - -
DIALLAGE:			10	- - -
ENSTATITE	MG-SI-03	5		- - -
WOLLASTONITE	CA-SI-03	5		- - -
LABRADORITE:			10	- - -
ANORTHITE	CA-AL2-SI2-08	6		- - -
ALBITE	NA-AL-SI3-08	4		- - -
TITANOMAGNETITE			5	- - -

V0 = 0.310 CC/G
V0I= 0.286 CC/G

IN THE TABLE BELOW DENSITY IS GIVEN IN G/CC, VELOCITY IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

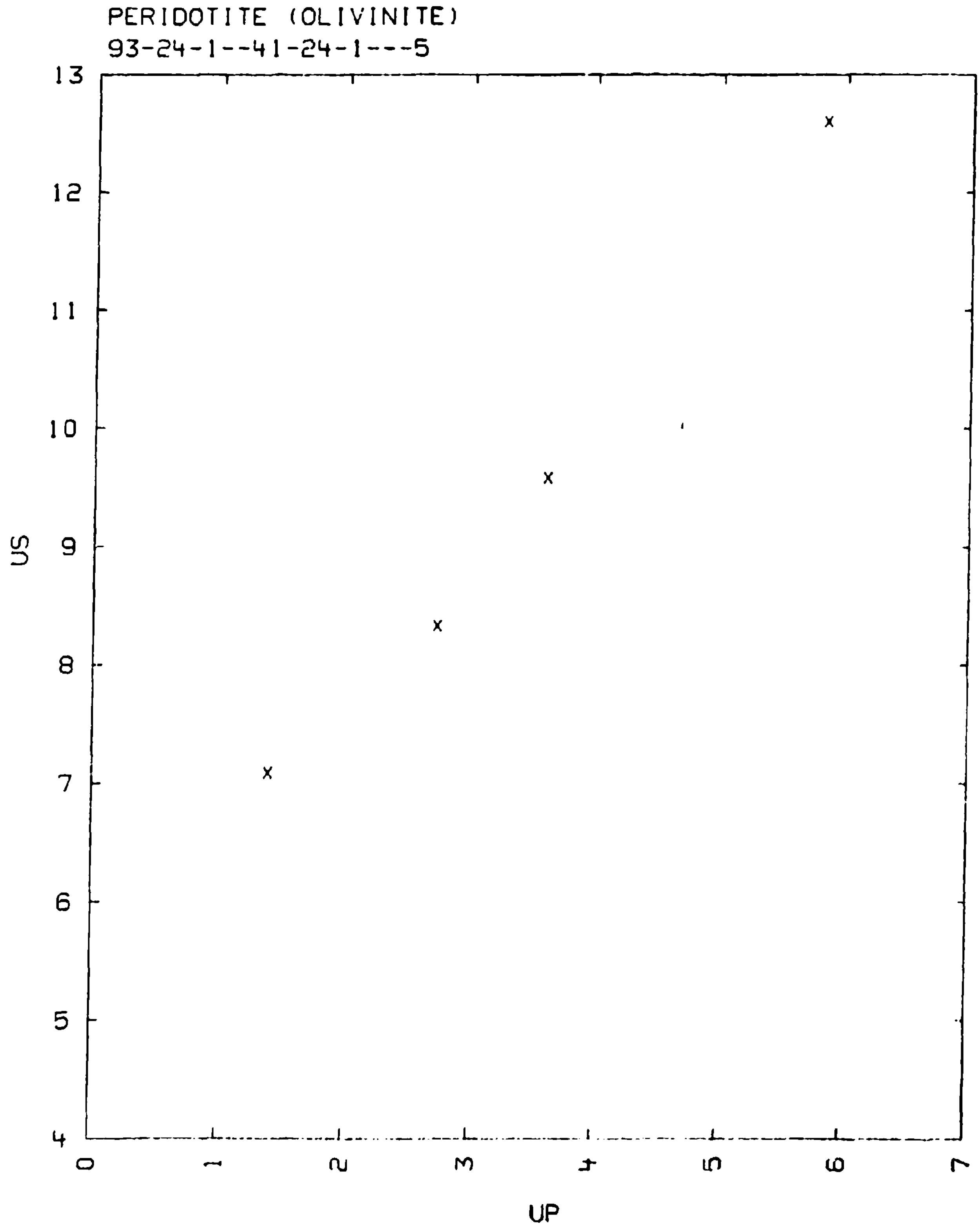
SAMPLE					STANDARD	
RHO0	US	UP	P	V/V0	MTRL	UP
3.22	7.08	1.40	319	0.802	AL	1.5
-	8.32	2.73	732	0.672	AL	2.82
-	9.57	3.61	1110	0.623	FE	2.80
-	12.60	5.84	2369	0.537	FE	4.56

US = 4.50 + 1.400•UP KM/SEC, FOR UP FROM 2.7 TO 6.0 KM/SEC.

COMMENTS:

1) SOURCE: TRUNIN, R. F., GON'SHAKOVA, V. I., SIMAKOV, G. V. AND GALDIN, N. E.
IZV. AKADEMII NAUK SSSR. FIZIKA ZEMLI, VOL. 9, 1965, P. 1-12.
2) EXPERIMENTAL TECHNIQUE A.
DATA REDUCTION METHOD 9. (STANDARD MATERIAL INDICATED IN THE TABLE).
3) THE SHOCK VELOCITY WAS MEASURED WITH AN ACCURACY OF 1.5 PERCENT UP TO 700 KBAR AND WITH 2 PERCENT ACCURACY AT HIGHER PRESSURE.
4) V0I WAS OBTAINED FROM THE LATTICE PARAMETERS GIVEN IN: CRYSTAL DATA DETERMINATIVE TABLES MONOGRAPH 5 (AMERICAN CRYST. ASSN., WASH. 1963) 2ND ED., AND A TITANOMAGNETITE DENSITY OF 5.1 G/CC.

TABLE I


PERIDOTITE (OLIVINITE)
93-24-1--41-24-1---5
US
UP
13
12
11
10
9
8
7
6
5
4
0
1
2
3
4
5
6
7

93-24-1--41-24-1---6
BRONZITITE, STILWATER COMPLEX, MONTANA (SILICATE ROCK)

BRONZITE			94	VOLUME	PERCENT
ENSTATITE	MG-SI-03	84.6		-	-
FERROSILITE	FE-SI-03	9.4		-	-
HORNBLENDE (SEE NOTE)			4	-	-
OLIVENE:			2	-	-
FORSTERITE	MG2-SI-04	1.72		-	-
FAYALITE	FE2-SI-04	.28		-	-

V0 = 0.305 CC/G   CL = 7.66 KM/SEC
V0I= 0.3034 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE SAMPLE HOLDER AND STANDARD MATERIAL.

TABLE

RHO0	US	UP	P	V/V0	US(ST)
3.28	6.84	0.52	117.	0.924	6.16
3.27	6.87	0.79	178.	0.885	6.54
3.27	6.99	0.86	197.	0.877	6.64
3.29	7.02	0.87	202.	0.876	6.66
3.28	7.24	1.09	259.	0.849	6.97
3.28	7.17	1.09	257.	0.848	6.97
3.27	7.14	1.12	261.	0.843	6.99
3.28	7.44	1.28	312.	0.828	7.23
3.28	7.45	1.32	321.	0.823	7.28
3.30	7.53	1.43	354.	0.810	7.44
3.28	7.54	1.55	384.	0.794	7.60
3.22	7.54	1.56	380.	0.793	7.59
3.27	7.56	1.59	394.	0.790	7.65
3.28	7.63	1.60	402.	0.790	7.67
3.27	7.59	1.61	401.	0.788	7.68
3.28	7.54	1.62	402.	0.785	7.69
3.28	7.61	1.63	406.	0.786	7.70
3.27	7.51	1.69	416.	0.775	7.76
3.28	7.62	1.70	426.	0.777	7.79
3.28	7.65	1.72	432.	0.775	7.82
3.28	7.64	1.89	472.	0.753	8.02
3.28	7.73	2.10	531.	0.728	8.29
3.28	7.79	2.15	549.	0.724	8.37
3.23	7.72	2.15	537.	0.722	8.34
3.28	7.76	2.19	557.	0.718	8.41
3.28	7.89	2.32	601	0.707	8.59
3.27	7.93	2.33	606	0.706	8.61
3.29	7.96	2.39	626	0.700	8.68
3.28	8.04	2.44	643	0.696	8.75
3.28	8.08	2.47	655	0.695	8.79
3.28	8.20	2.57	692	0.686	8.93
3.28	8.32	2.63	718	0.683	9.02
3.28	8.60	2.89	817	0.663	9.38
3.28	8.63	2.95	836	0.657	9.45
3.28	8.93	3.10	908	0.653	9.67

BRONZITITE, STILWATER COMPLEX, MONTANA (SILICATE R

RHOO	US	UP	P	V/VO	US(ST)
3.28	8.88	3.11	904	0.651	9.67
3.28	8.94	3.15	922	0.648	9.73
3.28	8.98	3.27	963	0.636	9.88
3.28	9.40	3.42	1055	0.636	10.13
3.28	9.17	3.46	1040	0.624	10.13
3.27	9.33	3.54	1082	0.619	10.25
3.28	9.36	3.55	1090	0.621	10.27

US = 6.08 + 1.03*UP KM/SEC. FOR UP FROM 0.8 TO 1.3 KM/SEC.
SIGMA US = 0.05 KM/SEC

US = 7.06 + 0.320*UP KM/SEC. FOR UP FROM 1.4 TO 2.2 KM/SEC.
SIGMA US = 0.04 KM/SEC.

US = 5.113 + 1.204*UP KM/SEC. FOR UP FROM 2.3 TO 3.6 KM/SEC.
SIGMA US = 0.064 KM/SEC

COMMENTS :

1) SOURCE: MCQUEEN R. G. AND MARSH S. P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY
LOS ALAMOS, NEW MEXICO
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) VOI WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED IN CRYSTAL DATA DETERMINATIVE TABLES (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION MONOGRAPH 5, 1963) 2ND ED - AND FROM THE MODAL ANALYSIS OF F. BIRCH, J. GEOPHYS RES., VOL. 65, P. 1083 (1960), AND HESS AND PHILLIPS, AMERICAN MINERALOGIST, VOL. 25, P 277 (1940).
A HORNBLENDE DENSITY OF 3.2 G/CC WASS ASSUMED
4) SAMPLES OBTAINED THROUGH F. BIRCH FROM STILLWATER COMPLEX, MONTANA.
5) FURTHER WORK IN PROGRESS
6) CL ALSO OBTAINED FROM BIRCH (1960) BY LINEAR EXTRAPOLATION OF HIS HIGH PRESSURE POINTS TO P=0 BAR.
7) AN ANALYSIS GIVEN BY HESS YIELDED THE FOLLOWING WEIGHT PERCENTAGES:

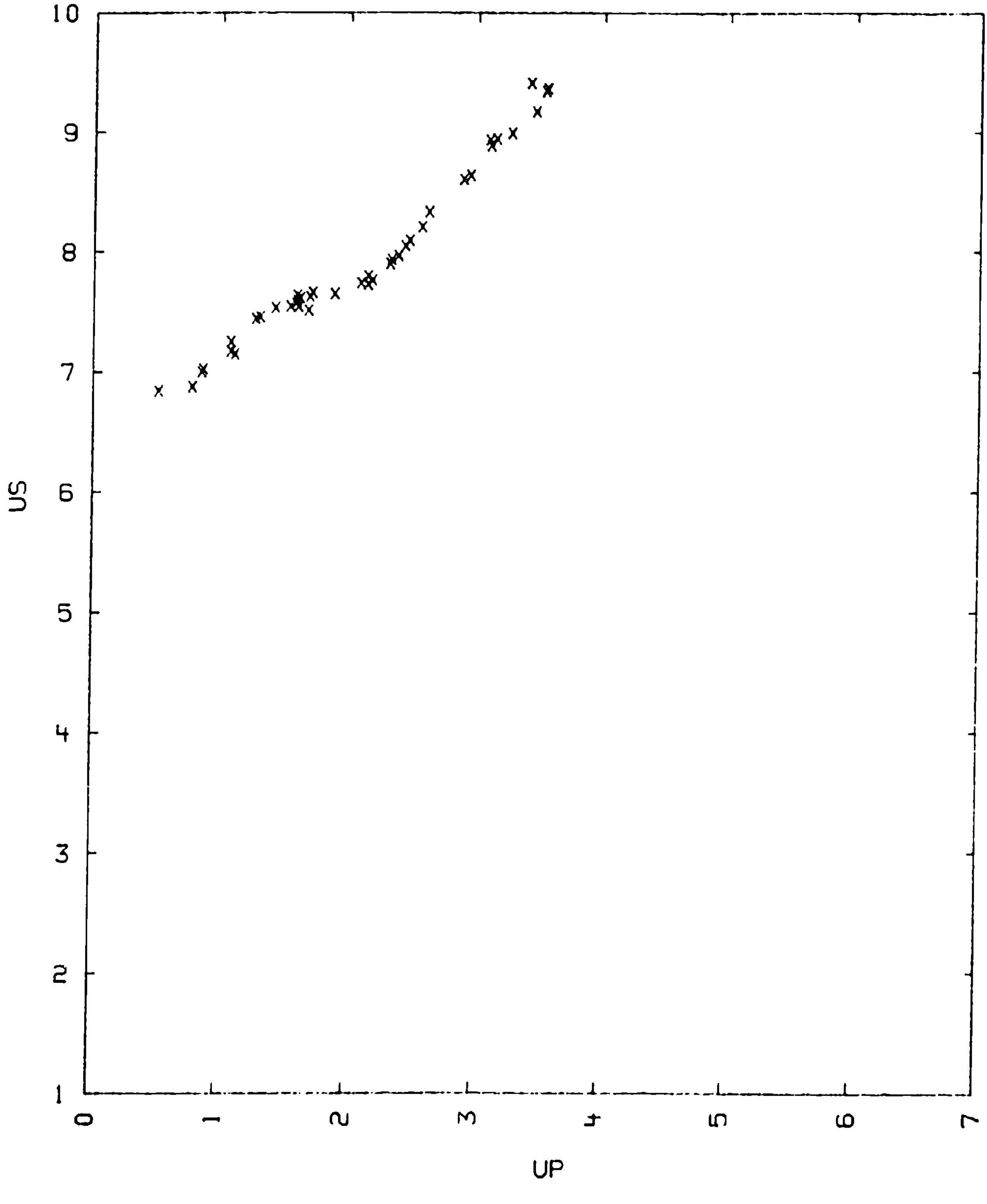
SI-02,	AL2-03,	FE2-03,	FE-0,	MG-0,	CA-0,	NA2-0,	K2-0,	H2-0,	TI-02
54.68	1.80	0.50	9.19	30.19	2.22	0.04	0.03	0.51	0.11

P2-05,	CR2-03,	MN-0	TOTAL
0.02	0.47	0.21	99.97

TABLE I

BRONZITITE, STILWATER COMPLEX, MONTANA (SILICATE R

93-24-1--41-24-1---6



93-24-1--94-24-1---7
OLIVINE

FORSTERITE	MG2-SI-04	91 +OR-1 WT PERCENT
FAYALITE	FE2-SI-04	9 +OR-1 - -

VO = 0.3040-0.3017 CC/G
VOI= 0.3008-0.3039 -

THE TABLES LIST DENSITY IN G/CC VELOCITY IN KM/SEC.AND PRESSURE IN KBAR
D IS SAMPLE THICKNESS IN MM AND MAT IS THE BASE PLATE MATERIAL.

TABLE I

SAMPLE												STANDARD	
RHOO	US1	UP1	P1	V1/V0	US2	UP2	UFS	P2	V2/V0	D	MAT	UFS
3.289	8.45	0.323	90.1	0.9618	6.58	0.665	1.24	163.	0.909	8.90	AL	1.55
3.315	8.72	0.323	93.4	0.963	8.21	1.59	3.37	437.	0.808	4.81	-	3.60

US =

TABLE II

SAMPLE							STANDARD	
RHOO	US	UP	UFS	P	V/VO	D	STM	UFS
3.289	8.45	0.272	0.544	75.	.9678	8.90	AL	1.55
3.289	8.39	2.19	4.22	604.	.739	4.82	AL	4.80
3.289	8.48	2.80	5.41	781.	.670	4.83	BR	4.40

US =

COMMENTS:

1) SOURCE: AHRENS T.J., ROSENBERG J.T., RUDERMAN M.H.
DYNAMIC PROPERTIES OF ROCKS
PROJECT FGU-4816. REPORT NO. DASA-1868 (SEPT. 30 1966)
STANFORD RESEARCH INSTITUTE
MENLO PARK, CALIF., USA
2) EXPERIMENTAL TECHNIQUE: CI (INCLINED MIRROR) AND D (UFS)
DATA REDUCTION METHOD : B AND D (FOR UP1)
3) VOI WAS ESTIMATED FROM THE ORTHORHOMBIC UNIT CELL CONSTANTS
5.99 10.246 4.756 A FOR A FE/MG MOLE RATIO OF: 0.0/1.0 TO .04/96
6.010 10.271 4.773 A FOR A FE/MG MOLE RATIO OF: .13/.87 TO .14/.86
6.014 10.357 4.768 A FOR A FE/MG MOLE RATIO OF: .22/.78 TO .23/.77

TABLE I

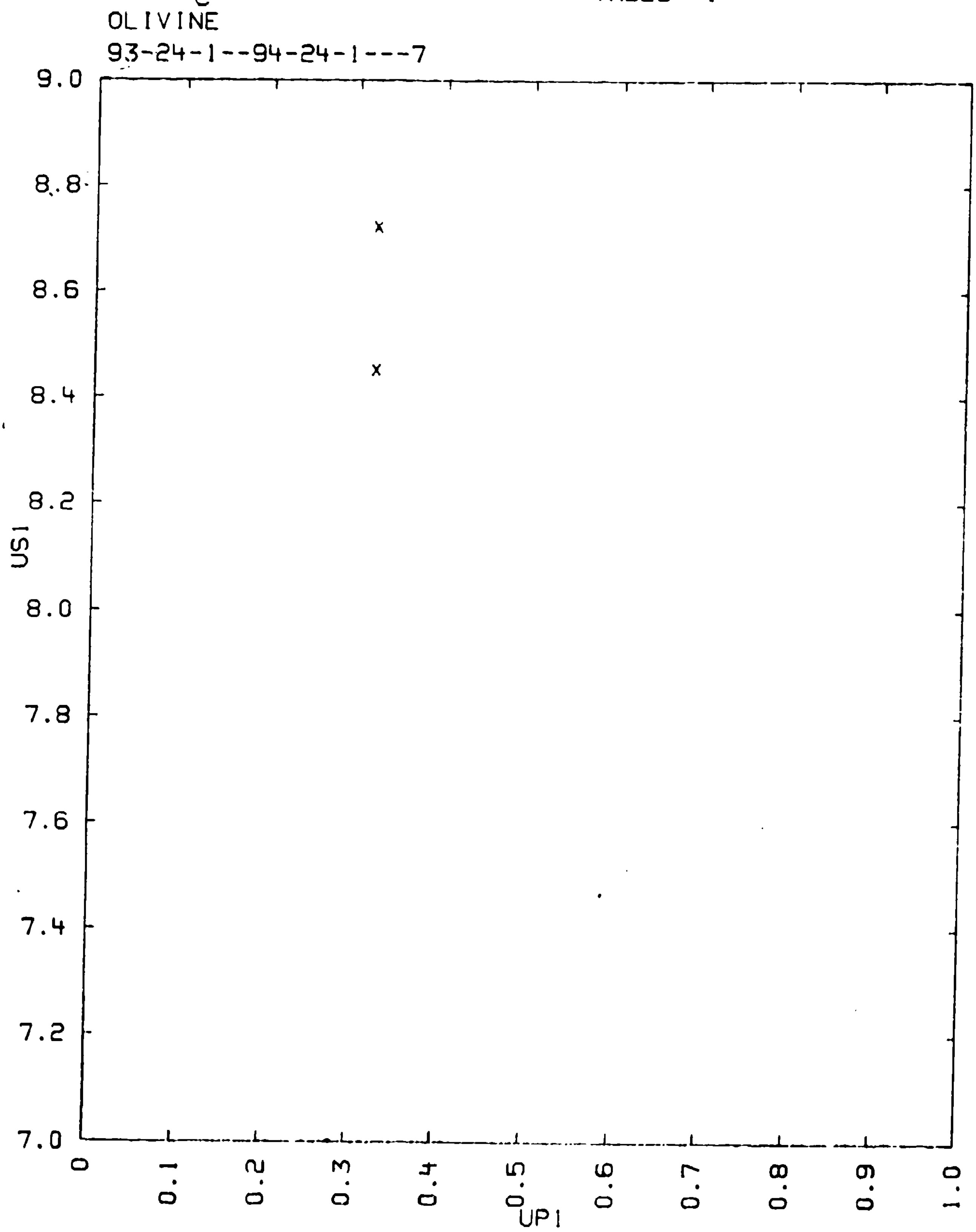

OLIVINE
93-24-1--94-24-1---7
9.0
8.8
8.6
8.4
8.2
8.0
7.8
7.6
7.4
7.2
7.0
US1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
UP1

TABLE I

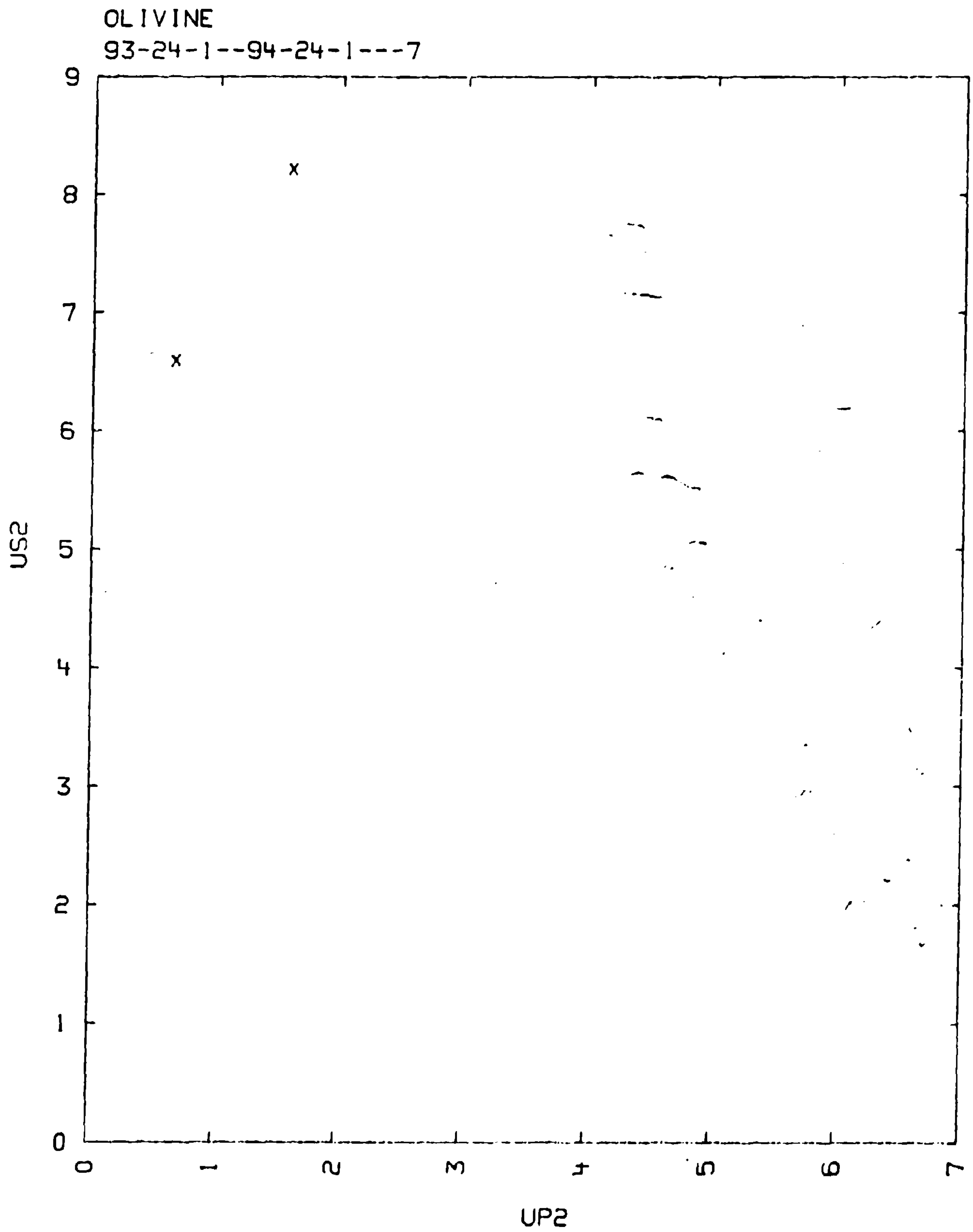
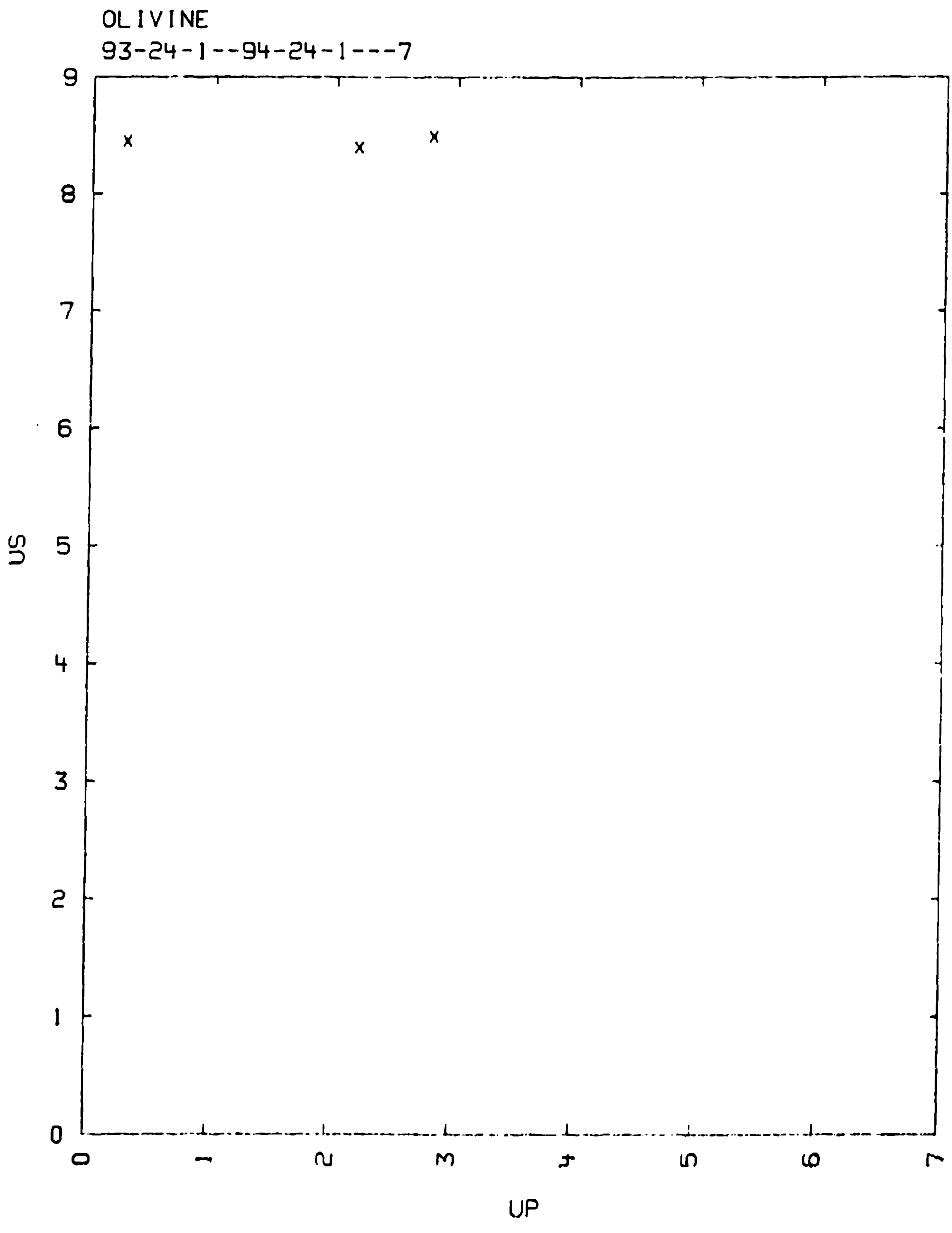


TABLE II



93-24-1--41-24-1--41-57-1---1
OLIVINITE II (SILICATE ROCK)

OLIVINE:			85 PERCENT BY VOLUME
FORSTERITE	MG2-SI-O4	59.5	- - -
FAYALITE	FE2-SI-O4	25.5	- - -
TITANOMAGNETITE			7 - - -
SERPENTINE	MG6-SI4-O10(O-H)8		5 - - -
TALC	MG3-SI4-O10(O-H)2		3 - - -

V0 = 0.312 CC/G
V0I= 0.277 CC/G

IN THE TABLE BELOW DENSITY IS GIVEN IN G/CC, VELOCITY IN KM/SEC AND PRESSURE KBARS.

TABLE

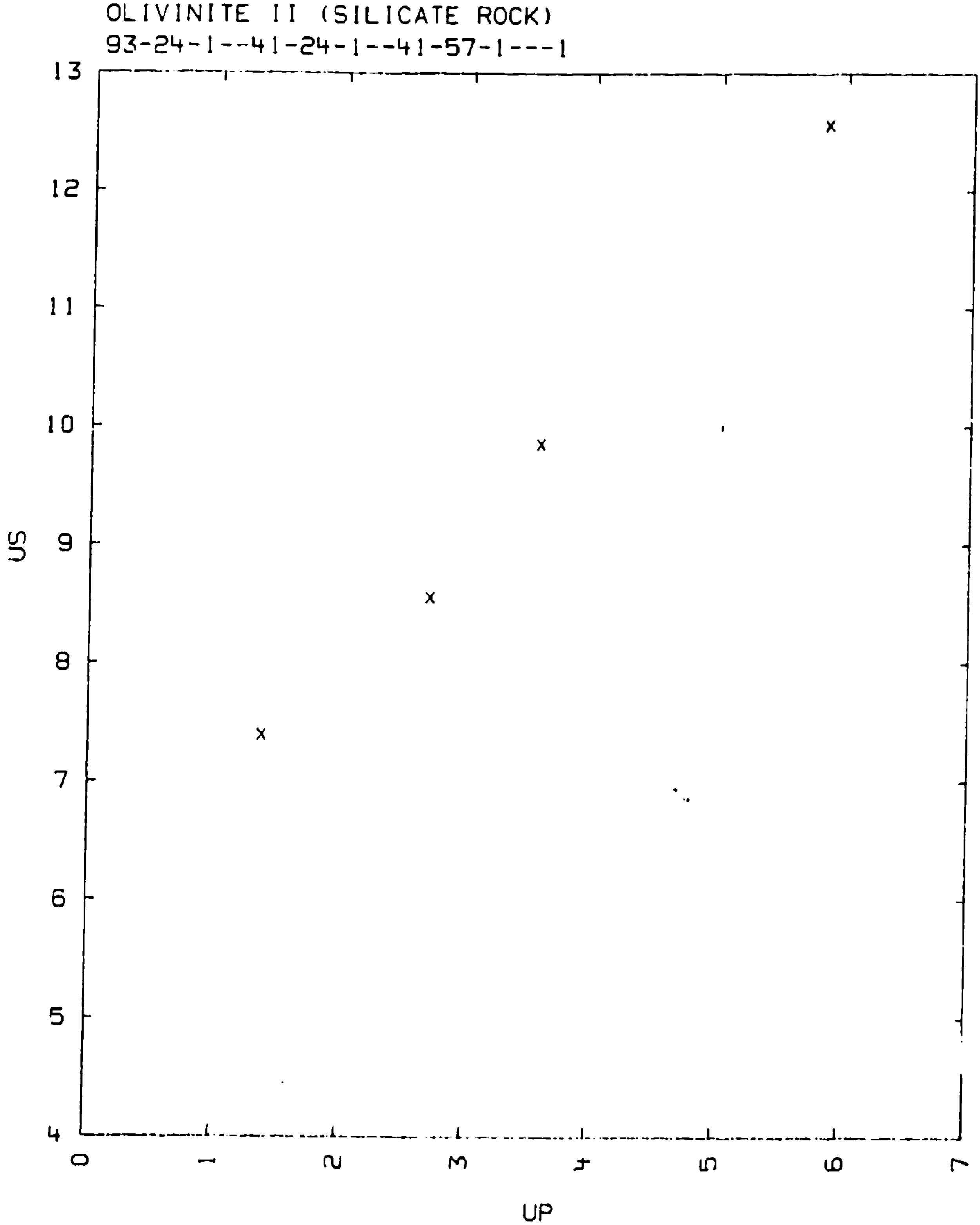
------ SAMPLE				------	STANDARD	
RHO0	US	UP	P	V/V0	MTRL.	UP
3.21	7.39	1.38	327	0.813	AL	1.5
-	8.55	2.70	741	0.684	AL	2.82
-	9.85	3.58	1133	0.637	FE	2.80
-	12.56	5.85	2360	0.534	FE	4.56

US = 5.23 + 1.270*UP KM/SEC, FOR UP FROM 2.7 TO 6.0 KM/SEC

COMMENTS:

1) SOURCE: TRUNIN, R. F., GON'SHAKOVA, V. I., SIMAKOV, G. V. AND GALDIN, N. E.
IZV. AKADEMII NAUK SSSR, FIZIKA ZEMLI, VOL. 9, 1965, P. 1-12.
2) EXPERIMENTAL TECHNIQUE A.
DATA REDUCTION METHOD B. (STANDARD MATERIAL INDICATED IN THE TABLE).
3) THE SHOCK VELOCITY WAS MEASURED WITH AN ACCURACY OF 1.5 PERCENT UP TO 700 KBAR AND WITH 2 PERCENT ACCURACY AT HIGHER PRESSURE.
4) V0I WAS OBTAINED FROM ASSUMED DENSITIES OF 5.1, 2.6 AND 2.8 G/CC FOR TITANOMAGNETITE, SERPENTINE, AND TALC. FOR OLIVINE THE LATTICE PARAMETERS LISTED IN CRYSTAL DATA DETERMINATIVE TABLES MONOGRAPH 5 (AMERICAN CRYST. ASSN. 1963) 2ND. ED.

TABLE I


OLIVINITE II (SILICATE ROCK)
93-24-1--41-24-1--41-57-1---1
13
12
11
10
9
8
7
6
5
4
US
0
1
2
3
4
5
6
7
UP

93-24-1--41-24-1--41-57-1---2
ORE-OLIVENITE (OLIVINITE) (SILICATE ROCK)

OLIVINE:			80 PERCENT BY VOLUME	
FORSTERITE	MG2-SI-04	56	-	-
FAYALITE	FE2-SI-04	24	-	-
TITANOMAGNETITE			20 -	-

VO = 0.271 CC/G
VOI = 0.257 CC/G

THE TABLE LISTS DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KBARS.

TABLE

------- SAMPLE				-------	STANDARD	
RHOO	US	UP	P	V/VO	MTRL	UP
3.69	7.61	1.27	356	0.833	AL	1.5
-	8.40	2.56	793	0.695	AL	2.82
-	7.78	2.20	631	0.717	CU	1.71
-	9.62	3.49	1239	0.637	FE	2.82

US = 4.96 + 1.324*UP KM/SEC, FOR UP FROM 2.2 TO 3.5 KM/SEC.

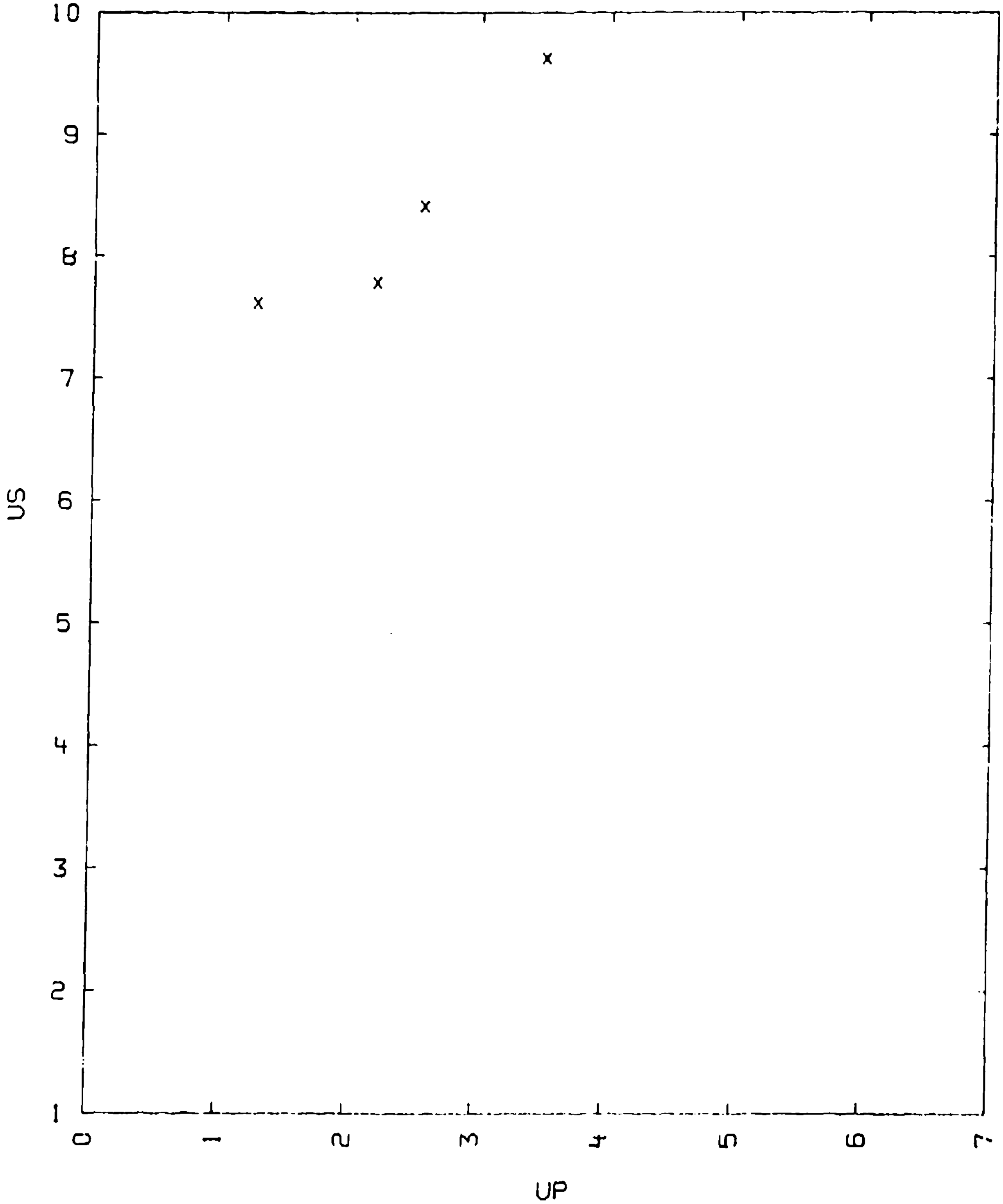
COMMENTS:

1) SOURCE: TRUNIN, R. F., GON'SHAKOVA, V. I., SIMAKOV, G. V. AND GALDIN, N. E.
IZV. AKADEMII NAUK SSSR, FIZIKA ZEMLI, VOL. 9, 1965, P. 1-12.
2) EXPERIMENTAL TECHNIQUE A.
DATA REDUCTION METHOD B, (STANDARD MATERIAL INDICATED IN THE TABLE).
3) THE SHOCK VELOCITY WAS MEASURED WITH AN ACCURACY OF 1.5 PERCENT UP TO 700 KBAR AND WITH 2 PERCENT ACCURACY AT HIGHER PRESSURE.
4) A DISCONTINUITY OBSERVED IN THE US VERSUS UP PLOT OCCURS BELOW US = 7.7 KM/SEC.
5) VOI WAS OBTAINED FROM AN ASSUMED DENSITY OF 5.1 G/CC FOR TITANOMAGNETITE AND OLIVINE LATTICE CONSTANTS GIVEN IN: CRYSTAL DATA DETERMINATIVE TABLES MONOGRAPH 5 (AMERICAN CRYST. ASSN. 1963) 2ND. ED.

TABLE I

ORE-OLIVENITE (OLIVINITE) (SILICATE ROCK)

93-24-1--41-24-1--41-57-1---2



93-24-1--41-24-1--93-24-2-1---1
DUNITE I (SILICATE ROCK)

OLIVINE:			50	PERCENT BY VOLUME
FORSTERITE	MG2-SI-04	25		- - -
FAYALITE	FE2-SI-04	25		- - -
SERPENTINE	MG6-SI4-O10(O-H)8		40	- - -
CHROMITE	FE-CR2-04		10	- - -

VO = 0.345 CC/G
VOI = 0.288 CC/G

IN THE TABLE BELOW DENSITY IS GIVEN IN G/CC, VELOCITY IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

------- SAMPLE				-------	STANDARD	
RHOO	US	UP	P	V/VO	MTRL	UP
2.9	6.85	1.50	298	0.801	AL	1.5
-	8.28	2.85	684	0.760	AL	2.82
-	9.39	3.75	1021	0.728	FE	2.82

US = 4.59 + 1.290·UP KM/SEC, FOR UP FROM 2.8 TO 3.8 KM/SEC.

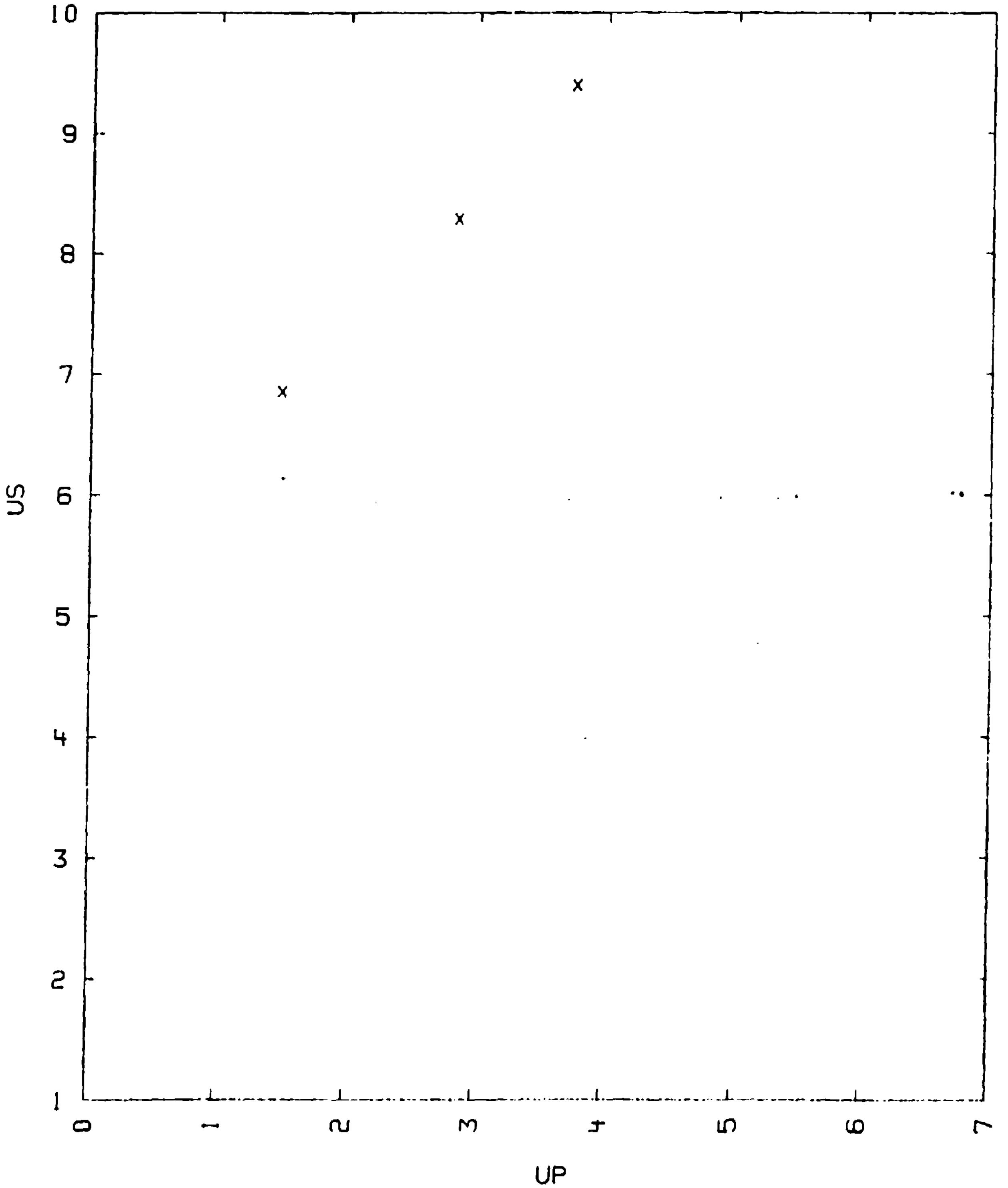
COMMENTS:

1) SOURCE: TRUNIN, R. F., GON'SHAKOVA, V. I., SIMAKOV, G. V. AND GALDIN, N. E.
IZV. AKADEMII NAUK SSSR, FIZIKA ZEMLI, VOL. 9, 1965, P. 1-12.
2) EXPERIMENTAL TECHNIQUE A.
DATA REDUCTION METHOD B, (STANDARD MATERIAL INDICATED IN THE TABLE).
3) THE SHOCK VELOCITY WAS MEASURED WITH AN ACCURACY OF 1.5 PERCENT UP TO 700 KBAR AND WITH 2 PERCENT ACCURACY AT HIGHER PRESSURE.
4) VOI WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED IN: CRYSTAL DATA DETERMINATIVE TABLES MONOGRAPH 5 (AMERICAN CRYST ASSN., WASH. 1963) 2ND. ED., AND A SERPENTENE DENSITY OF 2.65 G/CC.

TABLE I

DUNITE I (SILICATE ROCK)

93-24-1--41-24-1--93-24-2-1---



93-24-1--41-24-1--94-24-1--94-29-24-1--99-29-24-1---1
DOLERITE (TRAP) (SILICATE ROCK)

PIGEONITE-AUGITE			55	VOLUME	PERCENT
ENSTATITE	MG-SI-03	14.25		-	-
FERROSILITE	FE-SI-03	14.25		-	-
WOLLASTONITE	CA-SI-03	16.5		-	-
LABRADORITE:			30	-	-
ANORTHITE	CA-AL2-SI2-08	16.5		-	-
ALBITE	NA-AL-SI3-08	13.5		-	-
TITANOMAGNETITE			10	-	-
OLIVENE:			5	-	-
FORSTERITE	MG2-SI-04	3.		-	-
FAYALITE	FE2-SI-04	2.		-	-

V0 = 0.328 CC/G

THE TABLE LISTS DENSITY IN G/CC, VELOCITY IN KM/SEC AND PRESSURE IN KBARS.

TABLE

------ SAMPLE	------				STANDARD	
RHO0	US	UP	P	V/V0	MTRL	UP
3.05	5.80	0.67	119	0.884	AL	0.69
-	6.21	1.53	290	0.754	-	1.5
-	7.95	2.84	688	0.643	-	2.82
-	9.01	3.74	1028	0.585	FE	2.82
-	12.09	5.99	2209	0.505	-	4.56

US = 4.10 + 1.325*UP KM/SEC, FOR UP FROM 1.5 TO 6.0 KM/SEC.

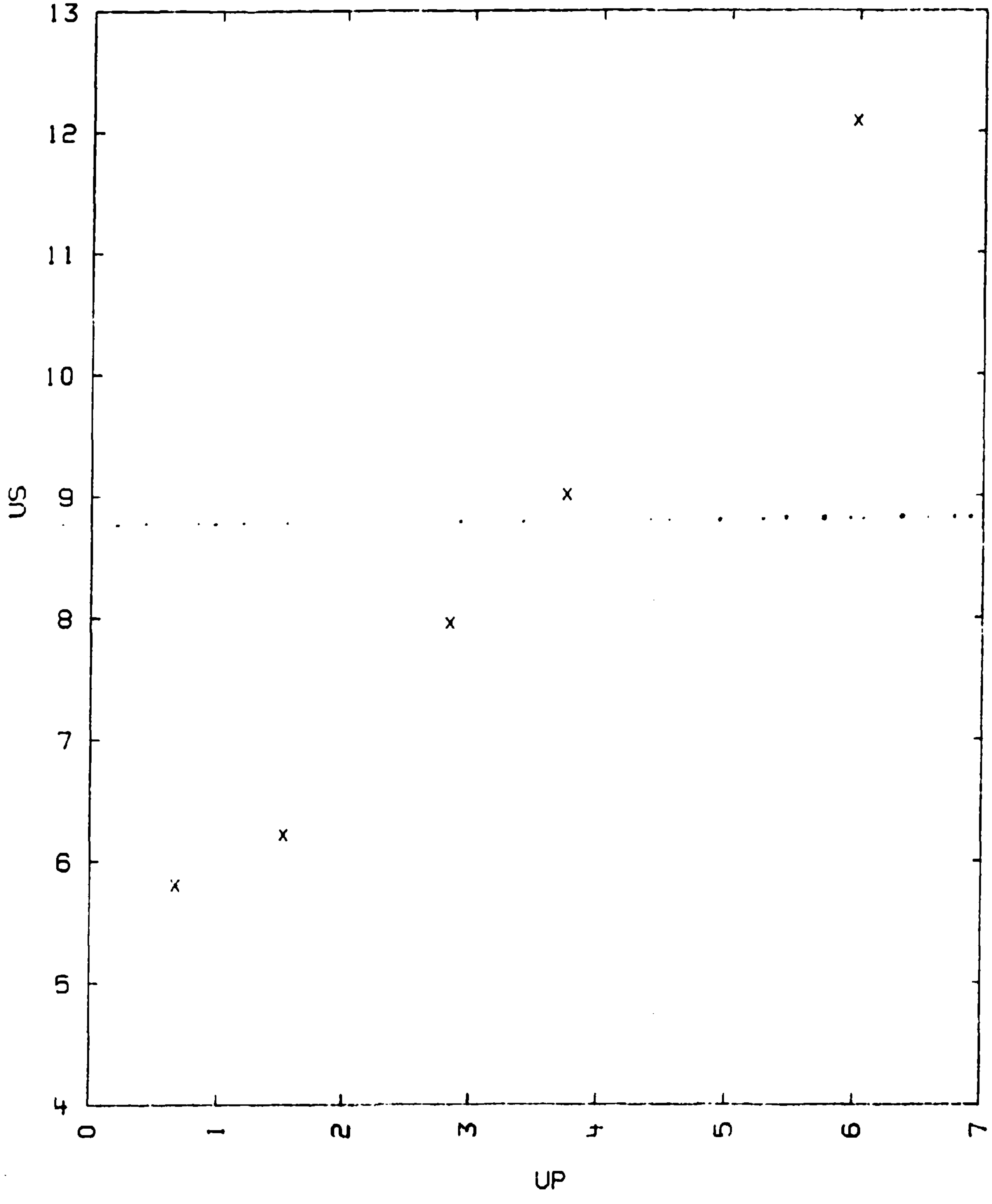
COMMENTS:

1) SOURCE: TRUNIN, R. F., GON'SHAKOVA, V. I., SIMAKOV, G. V. AND GALDIN, N. E.
IZV. AKADEMII NAUK SSSR, FIZIKA ZEMLI, VOL. 9, 1965, P. 1-12.
2) EXPERIMENTAL TECHNIQUE A.
DATA REDUCTION METHOD B, (STANDARD MATERIAL INDICATED IN THE TABLE).
3) THE SHOCK VELOCITY WAS MEASURED WITH AN ACCURACY OF 1.5 PERCENT UP TO 700 KBAR AND WITH 2 PERCENT ACCURACY AT HIGHER PRESSURE.
4) A DISCONTINUITY IN THE HUGONIOT IS OBSERVED AT US = 6.0 KM/SEC.

TABLE I

DOLERITE (TRAP) (SILICATE ROCK)

93-24-1--41-24-1--94-24-1--94-



93-24-1--93-24-2-1---1
DUNITE II (SILICATE ROCK)

OLIVINITE:			65	PERCENT BY VOLUME
FORSTERITE	MG2-SI-OJ	60.5		- - -
FAYALITE	FE2-SI-OJ	4.5		- - -
SERPENTINE	MG6-SI4-O10(OH)8		30	- - -
CHROMITE	FE-CR2-O4		5	- - -

V0 = 0.338 CC/G

V0I= 0.312 CC/G

THE TABLE LISTS DENSITY IN G/CC, VELOSITY IN KM/SEC AND PRESSURE IN KBARS.

TABLE

------- SAMPLE				-------	STANDARD	
RHO0	US	UP	P	V/V0	MTRL	UP
2.96	7.08	1.46	307	0.790	AL	1.5
-	8.51	2.80	706	0.748	AL	2.82
-	12.70	5.95	2240	0.532	FE	4.56

US = 4.54 + 1.370*UP KM/SEC FOR UP FROM 2.8 TO 6.0 KM/SEC.

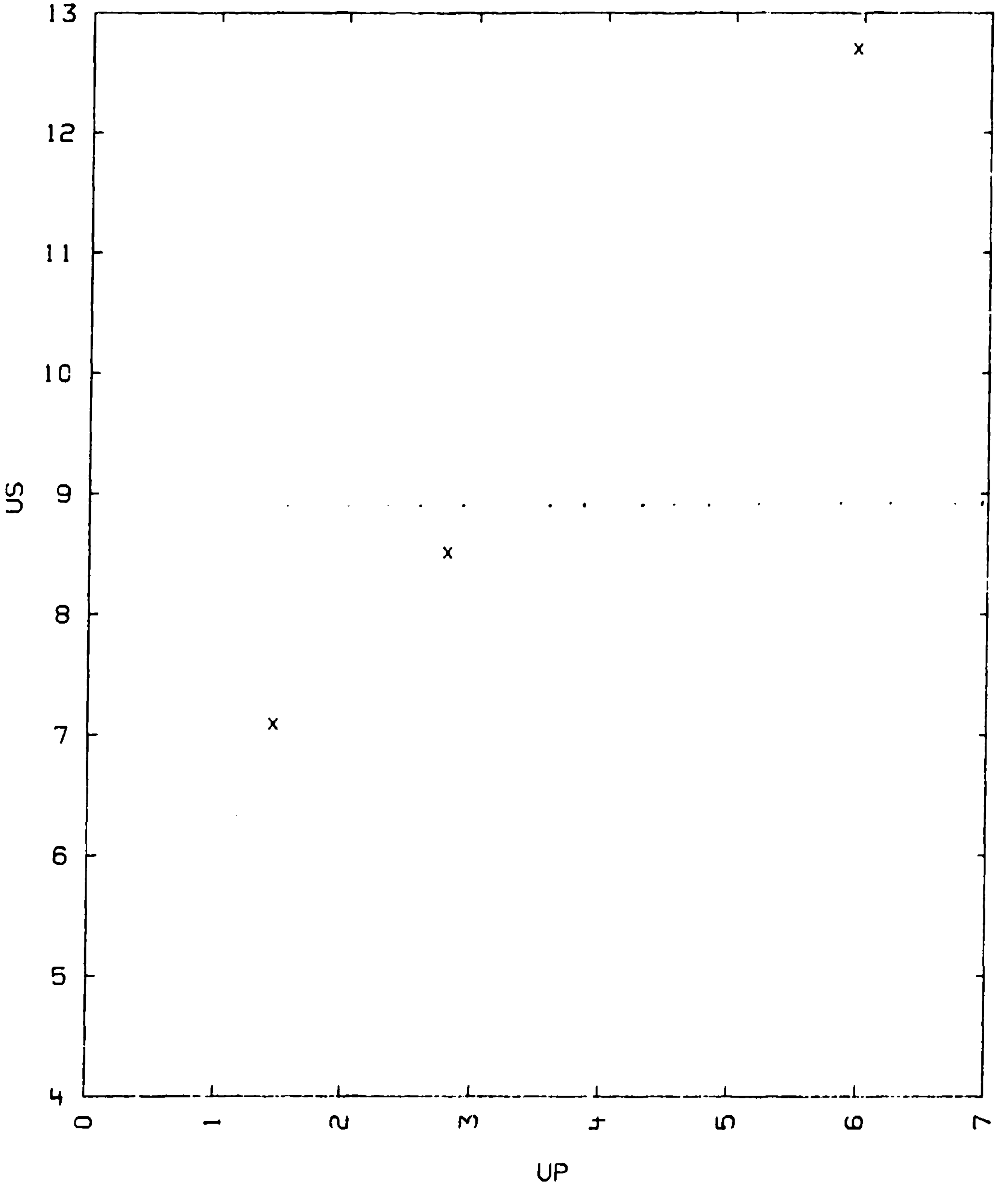
COMMENTS:

1) SOURCE: TRUNIN, R. F., GON'SHAKOVA, V. I., SIMAKOV, G. V. AND GALDIN, N. E.
IZV. AKADEMII NAUK SSSR, FIZIKA ZEMLI, VOL. 9, 1965, P. 1-12.
2) EXPERIMENTAL TECHNIQUE A.
DATA REDUCTION METHOD B. (STANDARD MATERIAL INDICATED IN THE TABLE).
3) THE SHOCK VELOCITY WAS MEASURED WITH AN ACCURACY OF 1.5 PERCENT UP TO 700 KBAR AND WITH 2 PERCENT ACCURACY AT HIGHER PRESSURE.
4) V0I WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED IN: CRYSTAL DATA DETERMINATIVE TABLES MONOGRAPH 5 (AMERICAN CRYST. ASSN., WASH. 1963) 2ND ED., AND A SERPENTINE DENSITY OF 2.65 G/CC.

TABLE I

DUNITE II (SILICATE ROCK)

93-24-1--93-24-2-1---1



93-24-1--94-24-1--93-24-2-1---1
DIOPSITITE (SILICATE ROCK)

DIALLAGE:			70	PERCENT BY VOLUME
ENSTATITE	MG-SI-O3	42		- - -
WOLLASTONITE	CA-SI-O3	28		- - -
SERPENTINE	MG6-SI4-O10(O-H)8		25	- - -
TITANOMAGNITITE			5	- - -

V0 = 3.32 CC/G

THE TABLE LISTS DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KBARS.

TABLE

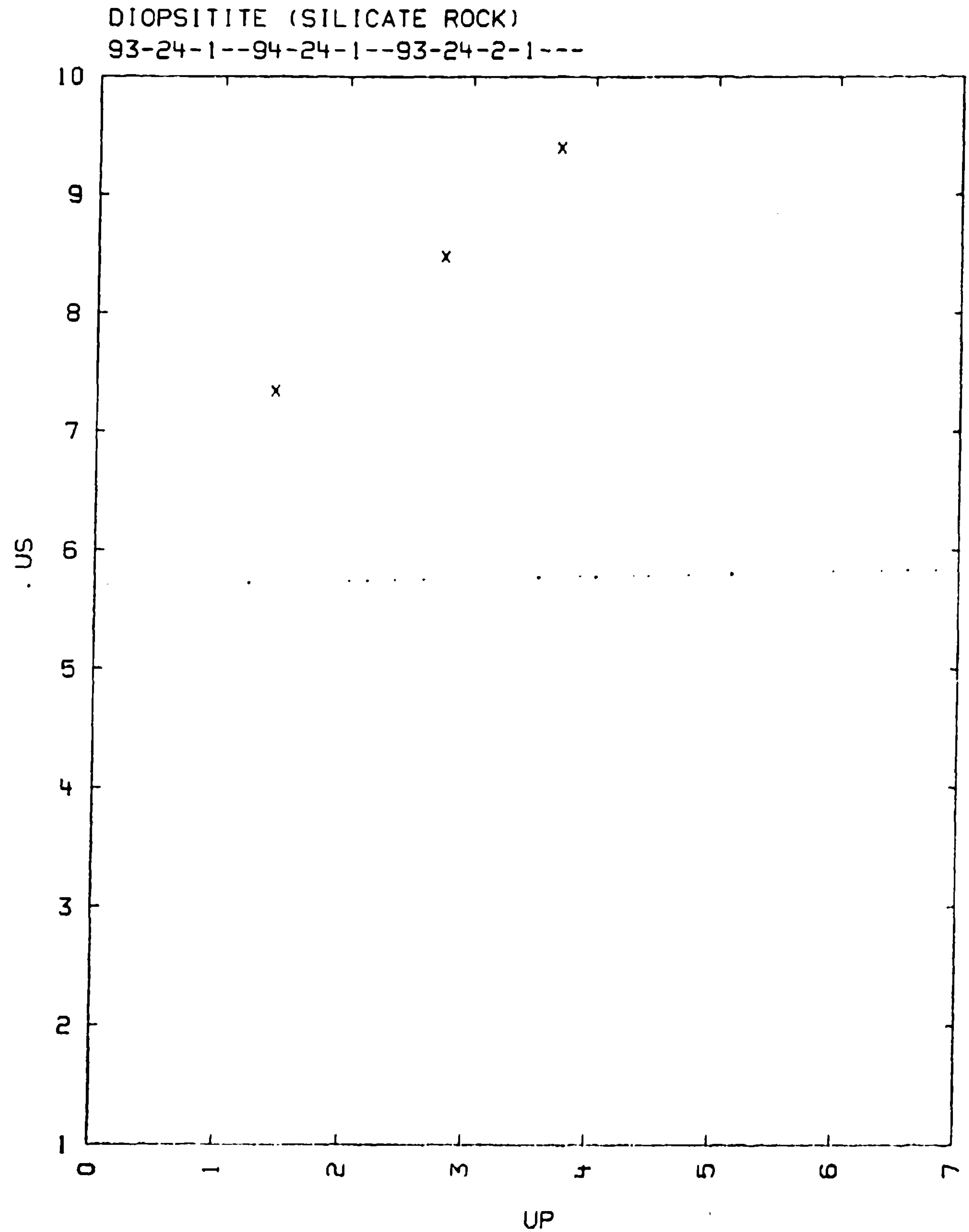
SAMPLE					STANDARD	
RHO0	US	UP	P	V/V0	MTRL	UP
3.01	7.33	1.43	316	0.805	AL	1.50
-	8.47	2.79	709	0.671	AL	2.82
-	9.39	3.72	1052	0.604	FE	2.82

US = 5.33 + 1.120*UP KM/SEC, FOR UP FROM 2.7 TO 3.8 KM/SEC.

COMMENTS:

1) SOURCE: TRUNIN, R. F., GON'SHAKOVA, V. 2., SIMAKOV, G. V. AND GALDIN, N. E.
IZV. AKADEMII NAUK SSSR. FIZIKA ZEMLI, VOL. 9, 1965, P. 1-12.
2) EXPERIMENTAL TECHNIQUE A.
DATA REDUCTION METHOD B, (STANDARD MATERIAL INDICATED IN THE TABLE).
3) THE SHOCK VELOCITY WAS MEASURED WITH AN ACCURACY OF 1.5 PERCENT UP TO 700 KBAR AND WITH 2 PERCENT ACCURACY AT HIGHER PRESSURE.

TABLE I



DIOPSITITE (SILICATE ROCK)
93-24-1--94-24-1--93-24-2-1---
US
UP
10
9
8
7
6
5
4
3
2
1
0
1
2
3
4
5
6
7

93-24-1--94-24-1--99-29-24-1---1
ENSTATITIC GABBRO (SILICATE ROCK)

BRONZITE:			60	PERCENT BY VOLUME
ENSTATITE	MG2-SI2-06			- - -
FERROSILITE	FE2-SI2-06	6		- - -
LABRADORITE:			35	- - -
ALBITE	NA-AL-SI3-08			- - -
ANORTHITE	CA-AL2-SI2-08	24.5		- - -
OLIVINE:			5	- - -
FORSTERITE	MG2-SI-04	2.5		- - -
FAYALITE	FE2-SI-04	2.5		- - -

VO = 0.317 CC/G
VOI= 0.321 CC/G

THE TABLE LISTS DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KBARS.

TABLE

------ SAMPLE				------	STANDARD	
RHOO	US	UP	P	V/VO	MTRL	UP
3.15	6.92	1.44	314	0.792	AL	1.5
-	8.39	2.74	724	0.673	AL	2.82
-	9.55	3.63	1091	0.620	FE	2.80
-	12.56	5.88	2325	0.532	FE	4.56

US = 4.66 + 1.355*UP KM/SEC, FOR UP FROM 2.7 TO 6.0 KM/SEC.

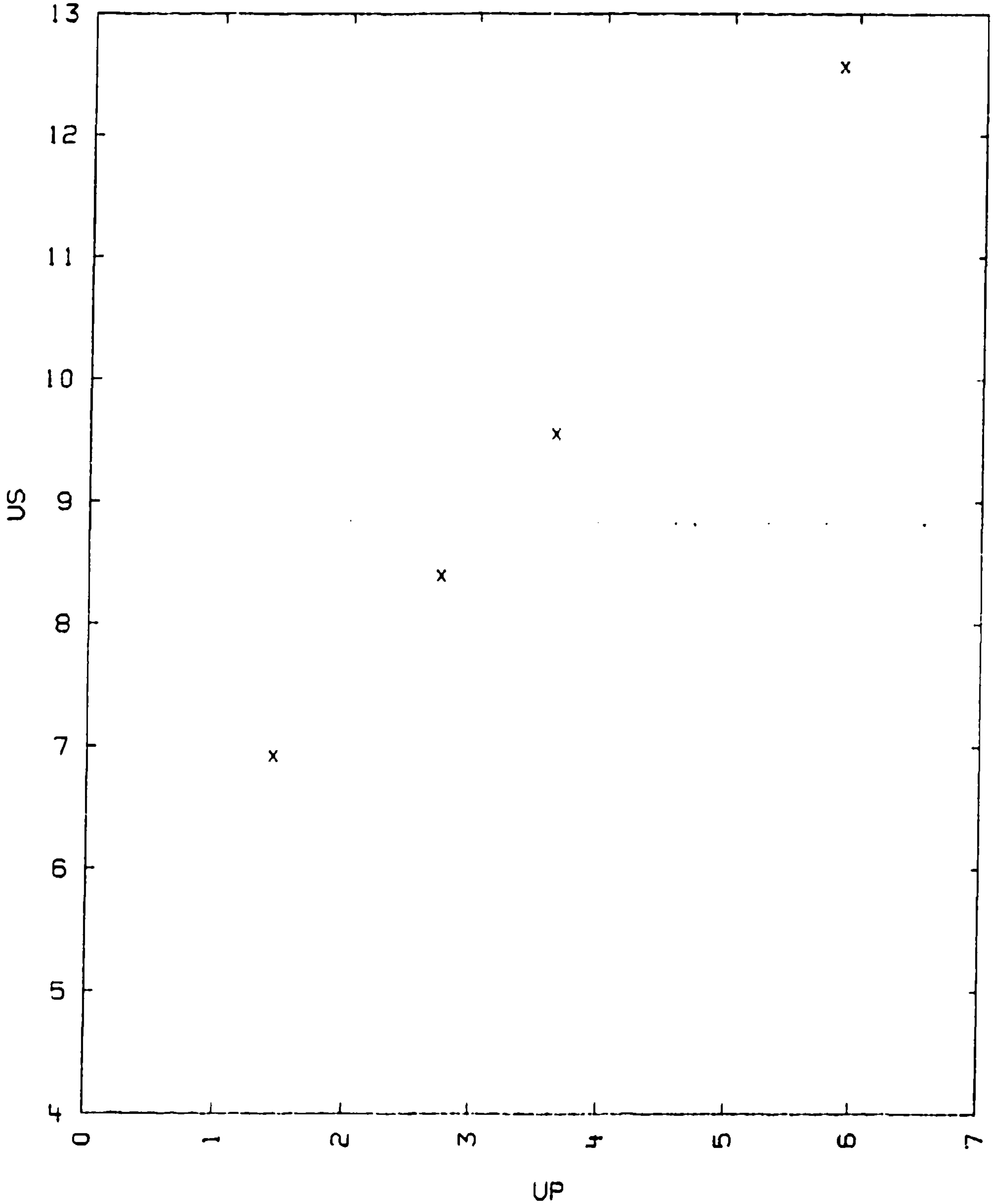
COMMENTS:

1) SOURCE: TRUNIN, R. F., GON'SHAKOVA, V. I., SIMAKOV, G. V. AND GALDIN, N. E.
IZV. AKADEMII NAUK SSSR, FIZIKA ZEMLI, VOL. 9, 1965, P. 1-12.
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION METHOD B. (STANDARD MATERIAL INDICATED IN THE TABLE).
3) THE SHOCK VELOCITY WAS MEASURED WITH AN ACCURACY OF 1.5 PERCENT UP TO 700 KBAR AND WITH 2 PERCENT ACCURACY AT HIGHER PRESSURE.
4) VOI WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED IN: CRYSTAL DATA DETERMINATIVE TABLES MONOGRAPH 5 (AMERICAN CRYST. ASSN. 1963) 2ND. ED

TABLE I

ENSTATITIC GABBRO (SILICATE ROCK)

93-24-1--94-24-1--99-29-24-1--



94-29-24-1--99-29-24-1--93-24-1--41-24-1---1
OLIVINITE (DIABASE) (SILICATE ROCK)

LABRADORITE:				50	VOLUME	PERCENT
	ANORTHITE	CA-AL2-SI2-08	30		-	-
	ALBITE	NA-AL-SI3-08	20		-	-
OLIVENE:				25	-	-
	FORSTERITE	MG2-SI-04	19		-	-
	FAYALITE	FE2-SI-04	6		-	-
PIGEONITE-AUGITE:				15	-	-
	ENSTATITE	MG-SI-03	7.5		-	-
	WOLLASTONITE	CA-SI-03	4.5		-	-
	FERROSILITE	FE-SI-03	3.0		-	-
TITANOMAGNETITE				10	-	-

VO = 0.319

THE TABLE LISTS DENSITY IN G/CC, VELOCITY IN KM/SEC AND PRESSURE IN KBARS.

TABLE

------- SAMPLE				-------	STANDARD	
RHOO	US	UP	P	V/VO	MTRL	UP
3.13	6.83	0.61	131	0.911	AL	0.69
	6.90	1.45	313	0.790	AL	1.50
	8.21	2.78	714	0.661	AL	2.82
	9.26	3.66	1061	0.605	FE	2.80
	12.32	5.92	2280	0.519	FE	4.56

US = 4.48 + 1.326*UP KM/SEC FOR UP FROM 1.6 TO 6.0 KM/SEC.

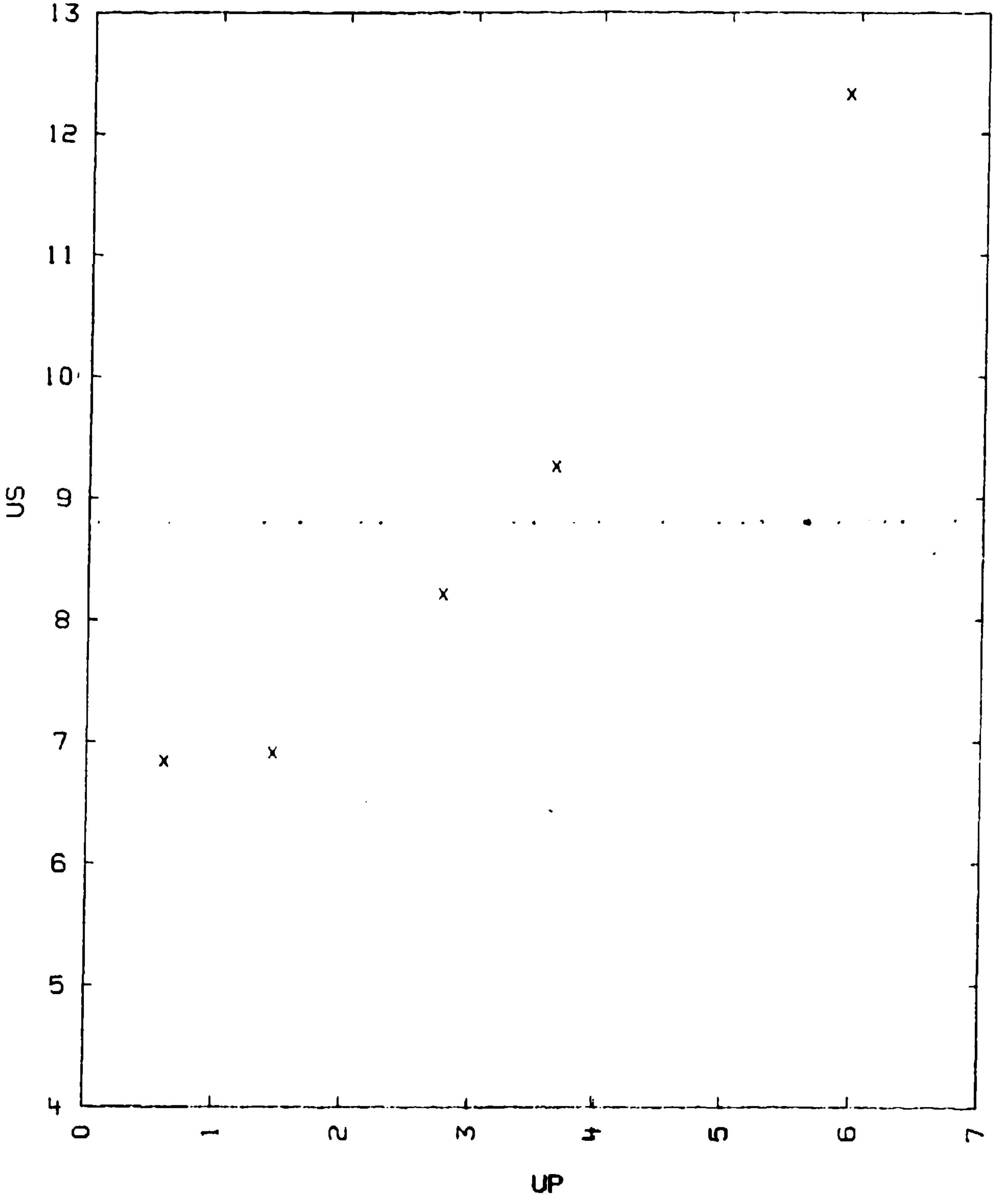
COMMENTS:

1) SOURCE: TRUNIN, R. F., GON'SHAKOVA, V. I., SIMAKOV, G. V. AND GALDIN, N. E.
IZV. AKADEMII NAUK SSSR, FIZIKA [illegible], VOL. 9, 1965, P. 1-12.
2) EXPERIMENTAL TECHNIQUE A.
DATA REDUCTION METHOD B, (STANDARD MATERIAL INDICATED IN THE TABLE).
3) THE SHOCK VELOCITY WAS MEASURED WITH AN ACCURACY OF 1.5 PERCENT UP TO 700 KBAR AND WITH 2 PERCENT ACCURACY AT HIGHER PRESSURE.
4) A DISCONTINUITY IN THE HUGONIOT IS OBSERVED AT US = 6.9 KM/SEC.

TABLE I

OLIVINITE (DIABASE) (SILICATE ROCK)

94-29-24-1--99-29-24-1--93-24-



94-29-24-1--99-94-93-41-29-24-1---1
DIABASE, CENTERVILLE, VA. (SILICATE ROCK)

ANORTHITE	CA-AL2-SI2-08	45	VOLUME PERCENT
AUGITE	(CA,NA)(MG,FE,AL)(SI,AL)2-06	45	- -
BIOTITE	K(MG,FE)3-AL-SI3-010(0-H)2	1.8	- -
QUARTZ	SI-02	1.8	- -
MICROCLINE	K-AL-SI3-08	3	- -

V0 = 0.335 CC/G   CL = 6.73 KM/SEC.

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE SAMPLE HOLDER AND STANDARD MATERIAL.

TABLE

RHOO	US	UP	P	V/V0	US(ST)
2.99	5.96	0.89	160.	0.851	6.55
3.00	6.00	0.91	164.	0.848	6.57
2.99	5.98	1.25	223.	0.791	6.97
2.99	5.99	1.27	226.	0.788	6.99
2.99	6.16	1.75	322.	0.716	7.58
2.98	6.18	1.77	326.	0.714	7.60
2.97	6.27	1.94	361	0.691	7.80
2.97	6.21	1.94	358	0.688	7.79
2.98	6.81	2.29	466	0.664	8.28
2.99	6.78	2.34	475	0.654	8.33
2.98	7.35	2.67	585	0.637	8.78
2.98	7.96	3.15	747	0.604	9.42
2.99	8.31	3.32	825	0.602	9.68
2.98	8.82	3.65	961	0.585	10.13
3.01	8.91	3.80	1019	0.573	10.33

US = 3.403 1.466*UP KM/SEC. FOR UP FROM 1.9 TO 3.8 KM/SEC
SIGMA US = 0.056 KM/SEC.

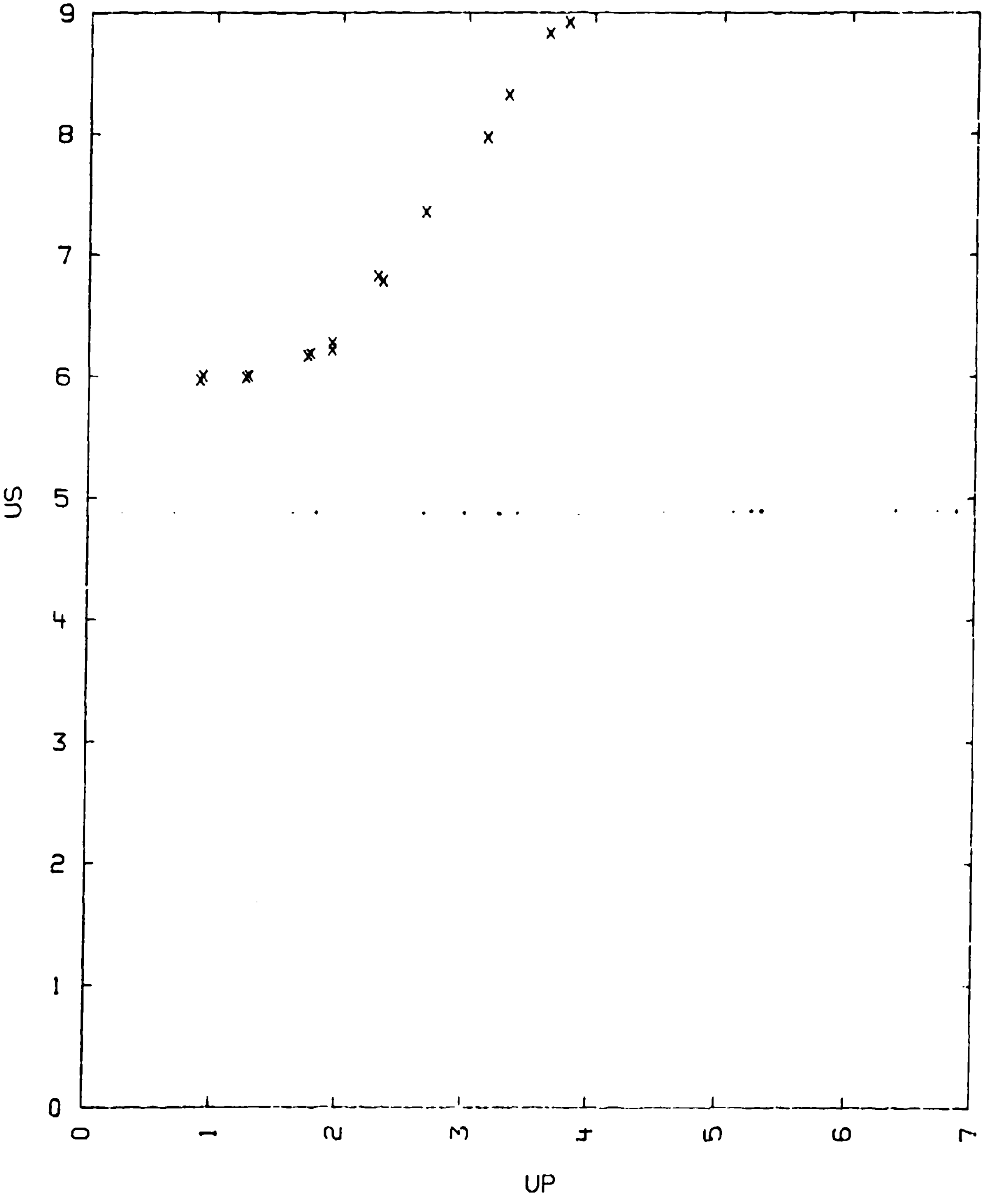
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) THE MODAL ANALYSIS OF THESE SAMPLES WHICH WERE OBTAINED FROM BIRCH
WAS TAKEN FROM: F. BIRCH, J. GEOPHYS. RES., VOL. 65, P. 1083 (1960)
4) FURTHER WORK IS IN PROGRESS.

TABLE I

DIABASE, CENTERVILLE, VA. (SILICATE ROCK)

94-29-24-1--99-94-93-41-29-24-



94-93-23-1--24-1---1
LIMESTONE, KAIBAB, ALPHA MEMBER

DOLOMITE	CA-MG(C-03)2	75 VOLUME PERCENT
QUARTZ	SI-02	20 - -
CALCITE, FELDSPAR, CLAY MINERALS, HEMATITE, GOETHITE AND HEAVY MINERALS		5 - -
POROSITY		20.3-23.8 PERCENT

V0 = 0.450 - 0.472 CC/G   C0 = 2.845 KM/SEC
V0I= 0.355 - 0.347 CC/G.

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES ARE IN KM/SEC. AND PRESSURE IN KILOBARS

TABLE

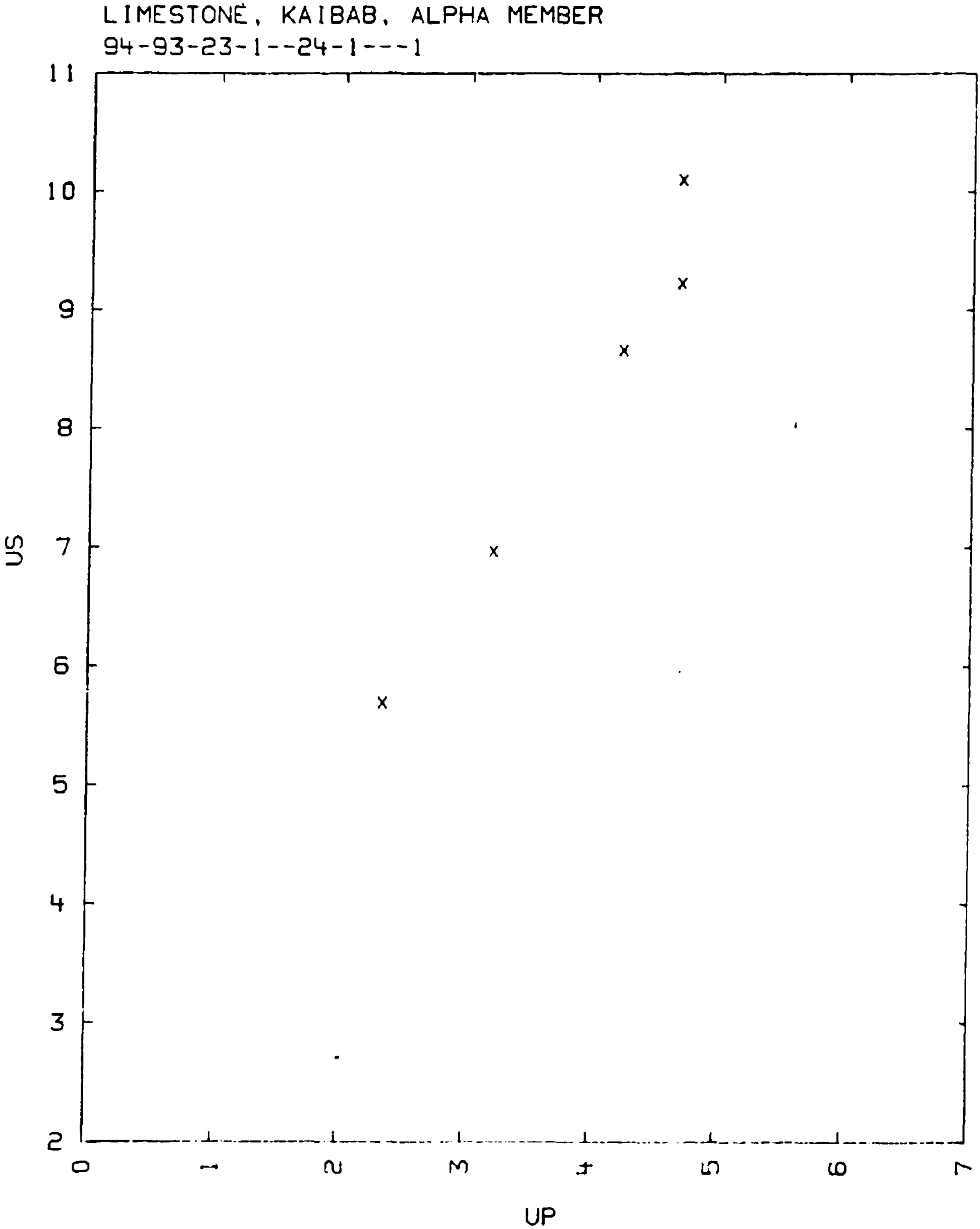
RHO0	US	UP	P	
2.22	5.69	2.35	297.	0.587
-	6.96	3.20	494.	0.541
-	8.65	4.23	812.	0.511
-	9.22	4.69	961.	0.491
-	10.10	5.05*	1131.	0.500

US = 1.89 + 1.597*UP KM/SEC.   SIGMA US = 0.13 KM/SEC.

COMMENTS:

1) SOURCE: JONES, A. H., ISBELL, W. M., SHIPMAN, F. H., PERKINS, R. D., GREEN, S. J. AND MAIDEN, C. J.
INTERIM REPORT, CONTRACT NAS2-3427, 1968
GENERAL MOTORS TECH. CENTER, WARREN, MICHIGAN 48090
2) EXPERIMENTAL TECHNIQUE A:
DATA REDUCTION TECHNIQUE A
STANDARD MATERIALS: OFHC COPPER AND FANSTEEL-77 ALLOY. THE COPPER STANDARD US-UP HUGONIOT RELATIONSHIP IS GIVEN BY:
US = 3.96 + 1.497*UP KM/SEC. RHO0 = 8.93 G/CC
THE FANSTEEL US-UP HUGONIOT IS GIVEN BY:
US = 3.96 + 1.295*UP KM/SEC. RHO0 = 17.01 G/CC
3) THESE PRESSURES WERE ACHIEVED BY USING A TWO-STAGE LIGHT GAS GUN. THE PROJECTILE IMPACT VELOCITY AND TILT WERE MEASURED BY TWO TIMED FLASH X-RAY SHADOWGRAPHS OF THE PROJECTILE.
4) THE UNCONFINED CRUSHING STRENGTH IS 3.50 - 4.30(10**8) DYNES/(CM**2)
5) THE ESTIMATED EXPERIMENTAL ERROR IN MEASURING US IS 1 - 2 PERCENT THE UNCERTAINTY IN UP IS ABOUT 0.2 PERCENT EXCEPT FOR A 5 PERCENT UNCERTAINTY IN THE LAST ENTRY
6) V0I WAS CALCULATED FROM THE ABOVE COMPOSITION AND THE DENSITIES LISTED BY: HURLBUT, DANAS MANUAL OF MINERALOLOGY (JOHN WILEY AND SONS INC., NEW YORK, 1963) 17TH ED.

TABLE I


LIMESTONE, KAIBAB, ALPHA MEMBER
94-93-23-1--24-1---1
US
UP
11
10
9
8
7
6
5
4
3
2
0
1
2
3
4
5
6
7

96-18-1--23-18-2-1(7-3-5-6)---1
BARATOL, CAST (EXPLOSIVE)

BARIUM NITRATE BA(NO3)2 76 WT PERCENT
TRINITROTOLUENE
-C(C-H3)-C(N-O2)(-C(H)-C(N-O2)-) = C7-N3-H5-O6 24 - -

VO = 0.388 CC/G
VO1 = 0.409 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UP	P	V/VO
2.580	2.92	0.36	27.1	0.877
-	3.02	0.35	27.3	0.884
-	3.00	0.41	31.7	0.863
-	3.00	0.41	31.7	0.863
-	4.17	0.86	92.5	0.794
-	3.35	0.44	38.0	0.869
-	3.67	0.58	54.9	0.842
-	3.19	0.45	24.4	0.859
-	4.15	0.87	61.4	0.790
-	4.34	0.85	95.2	0.804
-	3.71	0.70	67.0	0.811
-	3.77	0.74	72.0	0.804
-	4.13	0.72	76.7	0.826

US = 2.11 + 2.45*UP KM/SEC
SIGMA US = 0.13 KM/SEC

COMMENTS:

1) SOURCE: BOYLE, V. M.
PRIVATE COMMUNICATION
BALLISTIC RESEARCH LABORATORIES, AMXBR-TD
ABERDEEN PROVING GROUND, MARYLAND 21005.

2) EXPERIMENTAL TECHNIQUE: THE SHOCK VELOCITY IN THE SAMPLE WAS MEASURED BY A SMEAR CAMERA THAT SWEPT THE SHADOWGRAPH OF A TRANSPARENT CHANNEL IN THE SAMPLE ACROSS THE FILM PLANE. THE CHANNEL WAS MADE BY SPLITTING THE SAMPLE IN TWO ALONG THE SHOCK DIRECTION AND SEPARATING THE TWO HALVES BY A THIN (0.127 MM) TRANSPARENT PLASTIC SHEET (EXTRUDED ACETATE).

DATA REDUCTION TECHNIQUE: B
STANDARD MATERIALS USED:
ALUMINUM, 2024-T4, US = 5.360 + 1.351*UP KM/SEC
RHO = 2.785 G/CC
PLEXIGLASS, US = 2.702 + 1.544*UP, KM/SEC, RHO = 1.184 G/CC
UP = 1/2 UFS WAS ASSUMED FOR THE STANDARD MATERIALS SO THAT

THE PRESSURE ISENTROPE COULD BE OBTAINED BY REFLECTING THE
P VS. UP HUGONIOT IN THE LINE UP = 1/2 UFS.

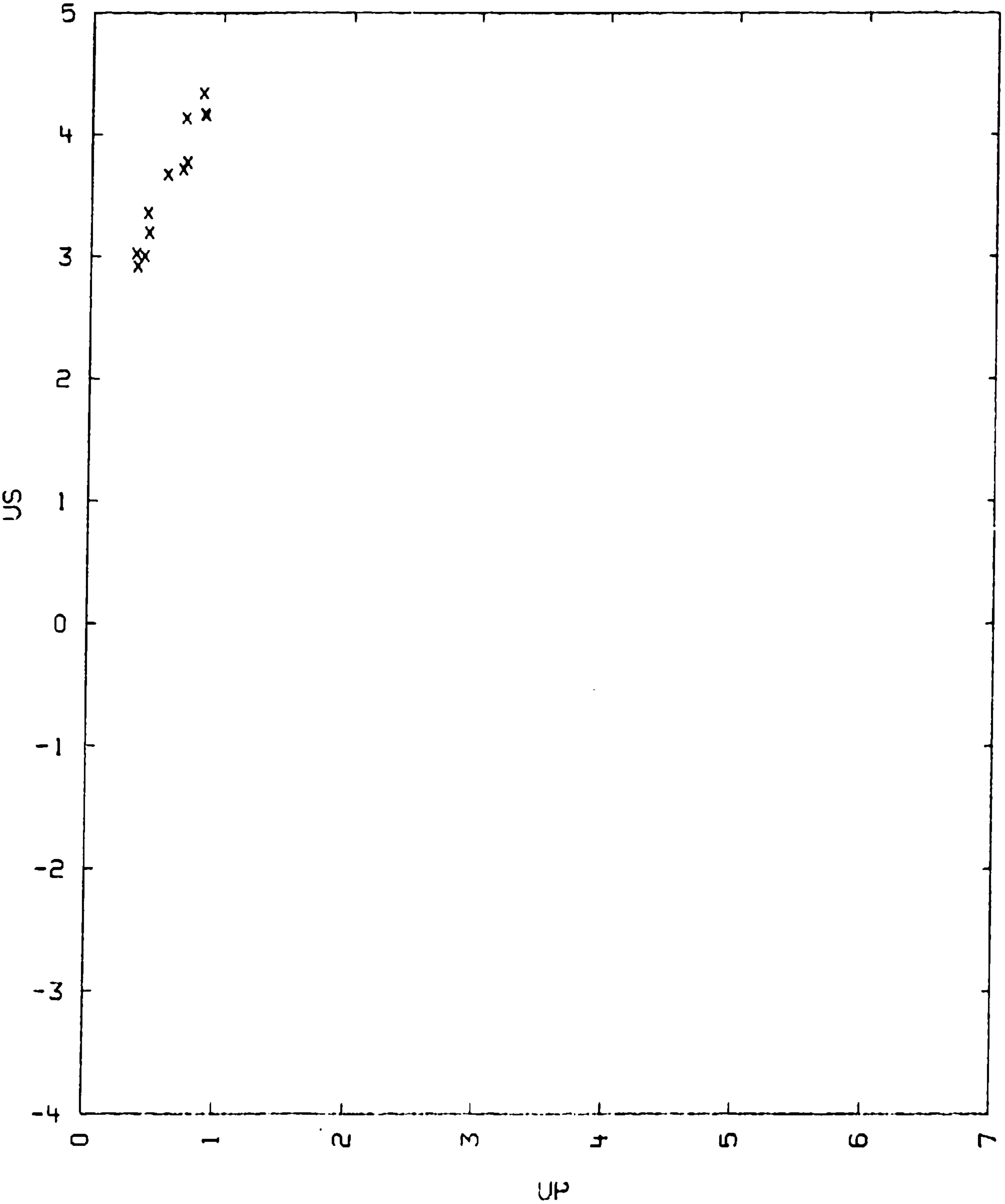
3) THE DEGREE TO WHICH THE RESULTS MAY BE AFFECTED BY CHEMICAL REACTION OF THE SHOCKED EXPLOSIVE SAMPLE HAS NOT BEEN DETERMINED AT THIS TIME.

4) VOI WAS CALCULATED ASSUMING VOLUME ADDITIVITY OF THE COMPONENTS:
VOI(TNT) = 0.6046 CC/G, HANDBOOK OF CHEM. AND PHYS. (CHEM. RUBBER PUBL. CO. 1964) 45TH ED.
VOI(BA-N2-O6) = 0.3073 CC/G, WYCKOFF, CRYSTAL STRUCTURES, VOL. 2 (INTERSCIENCE PUBL., N. Y., 1964).

TABLE I

BARATOL, CAST (EXPLOSIVE)

96-18-1--23-18-2-1(7-3-5-6)---



98-28-1--23-18-2-1(200-10-286-33)---1
LITHIUM TETRABORATE-EPOXY

LITHIUM TETRABORATE L12-B4-07-(H2-0)5 — 90 WT PERCENT
EPOXY (C200-N10-H286-033)N — 10 WT PERCENT

V0 = 0.458 - 0.460 CC/G   CL = 4.40 KM/SEC   C0 = 3.14 KM/SEC
CS = 2.67

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

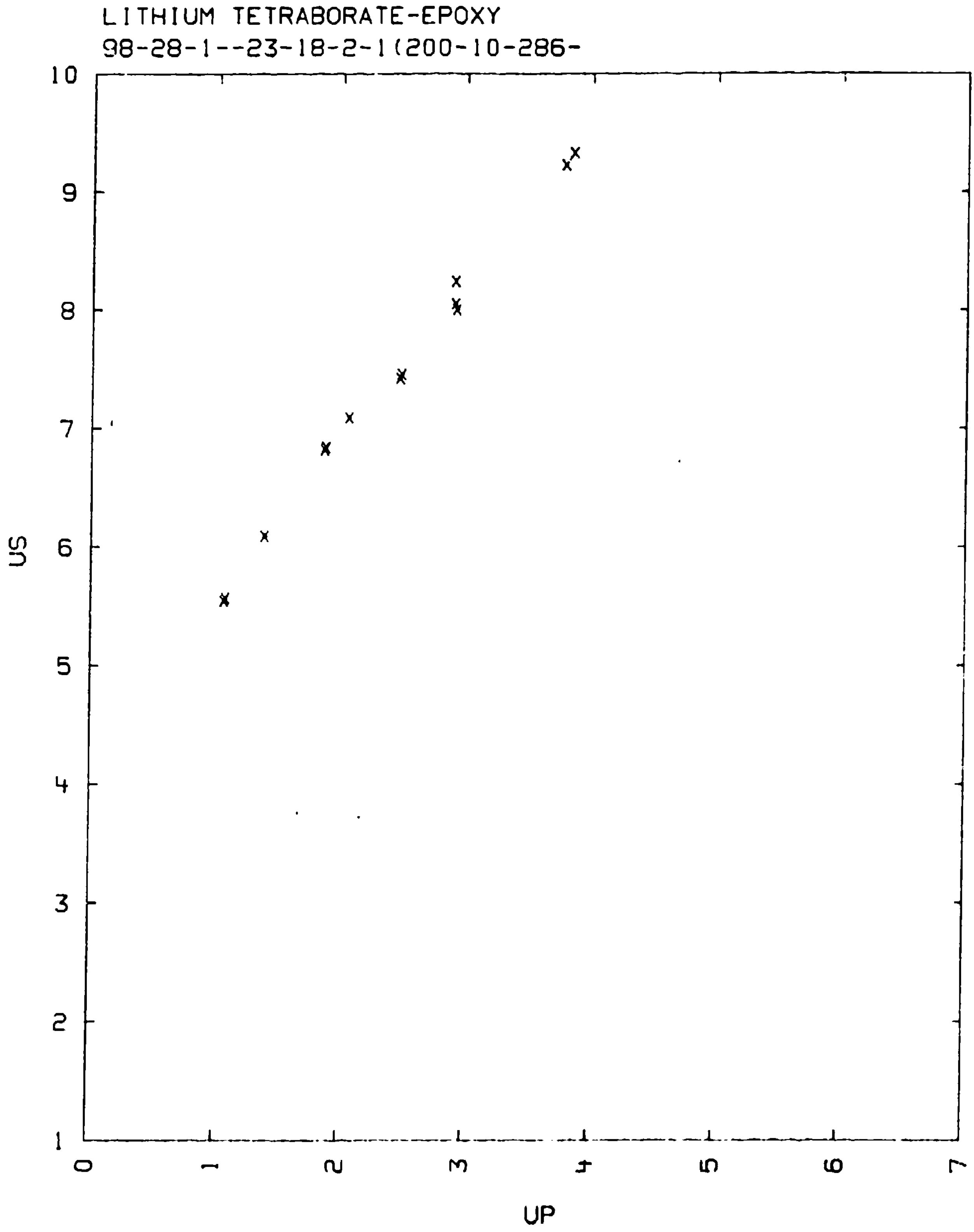
----SAMPLE----					----STANDARD----	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
2.174	5.54	1.07	129.	0.8069	2024 AL	6.54
2.181	5.56	1.08	131.	0.8058	2024 AL	6.55
2.177	6.09	1.39	184.	0.7718	2024 AL	6.92
2.175	6.09	1.40	185.	0.7701	2024 AL	6.93
2.188	6.81	1.87	279.	0.7254	2024 AL	7.51
2.181	6.83	1.88	280.	0.7247	2024 AL	7.52
2.177	7.09	2.07	320.	0.7080	2024 AL	7.75
2.179	7.42	2.48	401.	0.6658	2024 AL	8.22
2.176	7.45	2.49	404.	0.6658	2024 AL	8.23
2.178	8.04	2.91	510.	0.6381	2024 AL	8.75
2.176	8.23	2.92	523.	0.6452	2024 AL	8.79
2.178	8.00	2.93	511.	0.6337	2024 AL	8.76
2.173	9.22	3.78	757.	0.5900	2024 AL	9.82
2.172	9.32	3.85	779.	0.5869	2024 AL	9.91

US = 4.052 + 1.486*UP - 0.033*UP**2 KM/SEC
SIGMA US = 0.094 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B
3) THE EPOXY COMPOSITION WAS ASSUMED TO BE THAT OF EPOXY 815, APPLICABL TO ENTRY 36-1--23-18-2-1(200-10-286-33)---1 (COPPER OXIDE EPOXY)

TABLE I


LITHIUM TETRABORATE-EPOXY
98-28-1--23-18-2-1(200-10-286-
US
UP
10
9
8
7
6
5
4
3
2
1
0
1
2
3
4
5
6
7

98-29-24-1--23-18-2-1(200-10-286-33)---1
ZERIFAC- EPOXY

ZERIFAC	LI-AL-SI-04	71 WT PERCENT
EPOXY	C200-N10-H286-033	29 WT PERCENT
EPON 815	C200-H261-036,	90 WT PERCENT
DIETHYLTRIAMINE	H-N(-C(H2)-C(H2)-N-H2)2,	10 WT PERCENT

VO = 0.563

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

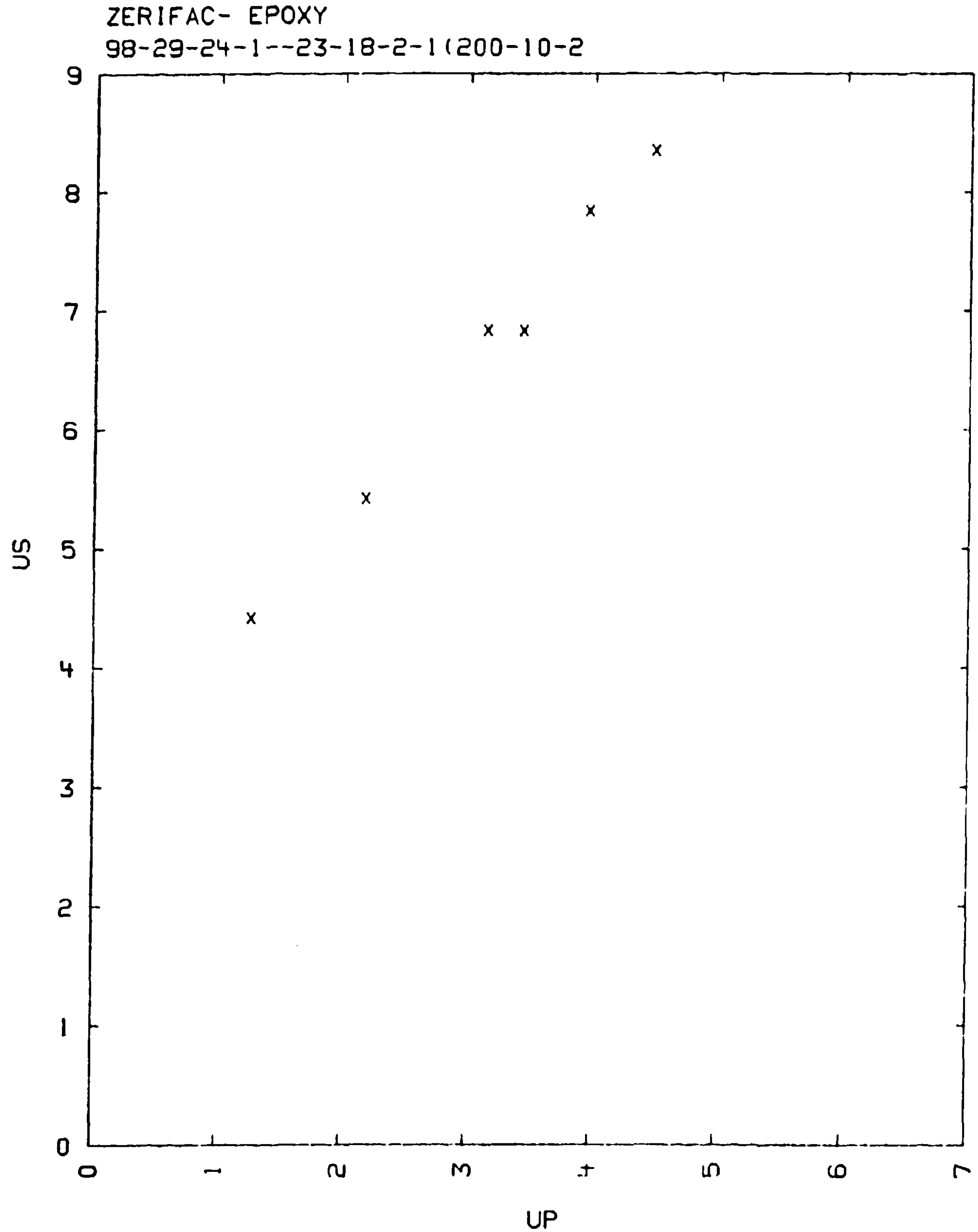
SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
1.777	4.41	1.27	100.	0.7120	2024 AL	6.56
1.776	5.42	2.19	211.	0.5959	2024 AL	7.54
1.776	6.82	3.15	382.	0.5381	2024 AL	8.62
1.774	6.82	3.44	416.	0.4956	2024 AL	8.89
1.775	7.83	3.96	550.	0.4943	2024 AL	9.53
1.775	8.35	4.48	664.	0.4635	2024 AL	10.10

US = 2.765 + 1.247*UP KM/SEC
SIGMA US = 0.156 KM/SEC

COMMENTS:

1) SOURCE: MC QUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M. AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B
3) EPON 815 COMPOSITION. PRIVATE COMMUNICATION, P. FLEMING (LLL, LIVERMORE, CA, 1975), SE ALSO MODERN PLASTICS ENCYCLOPEDIA (MC GRAW HILL, N.Y., 1975) VOL. 51

TABLE I



98-29-24-1--23-18-2-1(200-16-286-79)---1
ZERIFAC- POLYURETHANE FOAM

ZERIFAC	LI-AL-SI-04	50 WT PERCENT
POLYURETHANE	C200-N18-H286-079	50 WT PERCENT

VO = 1.39-1.43 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
0.702	2.58	1.62	29.	0.3721	2024 AL	6.53
0.699	2.71	1.63	31.	0.3965	2024 AL	6.55
0.705	3.30	2.06	48.	0.3758	2024 AL	6.91
0.712	3.72	2.39	63.	0.3575	2024 AL	7.18
0.703	4.35	2.79	85.	0.3586	2024 AL	7.53
0.708	4.43	2.82	88.	0.3634	2024 AL	7.56
0.721	4.33	2.86	89.	0.3395	2024 AL	7.59
0.709	4.53	3.01	97.	0.3355	2024 AL	7.71
0.707	5.69	3.67	148.	0.3550	2024 AL	8.32
0.706	5.52	3.67	143.	0.3351	2024 AL	8.30
0.709	5.71	3.98	161.	0.3030	2024 AL	8.56
0.705	6.19	4.13	180.	0.3328	2024 AL	8.72
0.708	6.33	4.45	199.	0.2970	2024 AL	8.98
0.701	6.48	4.47	203.	0.3102	2024 AL	9.01
0.704	6.43	4.51	204.	0.2986	2024 AL	9.03
0.707	6.39	4.52	204.	0.2926	2024 AL	9.04
0.704	6.77	4.62	220.	0.3176	2024 AL	9.16
0.706	7.79	5.38	296.	0.3094	2024 AL	9.86
0.703	7.91	5.45	303.	0.3110	2024 AL	9.93
0.717	8.06	5.79	335.	0.2816	2024 AL	10.23

US = 0.327 + 1.479*UP - 0.021*UP**2
SIGMA US = 0.124 KM/SEC

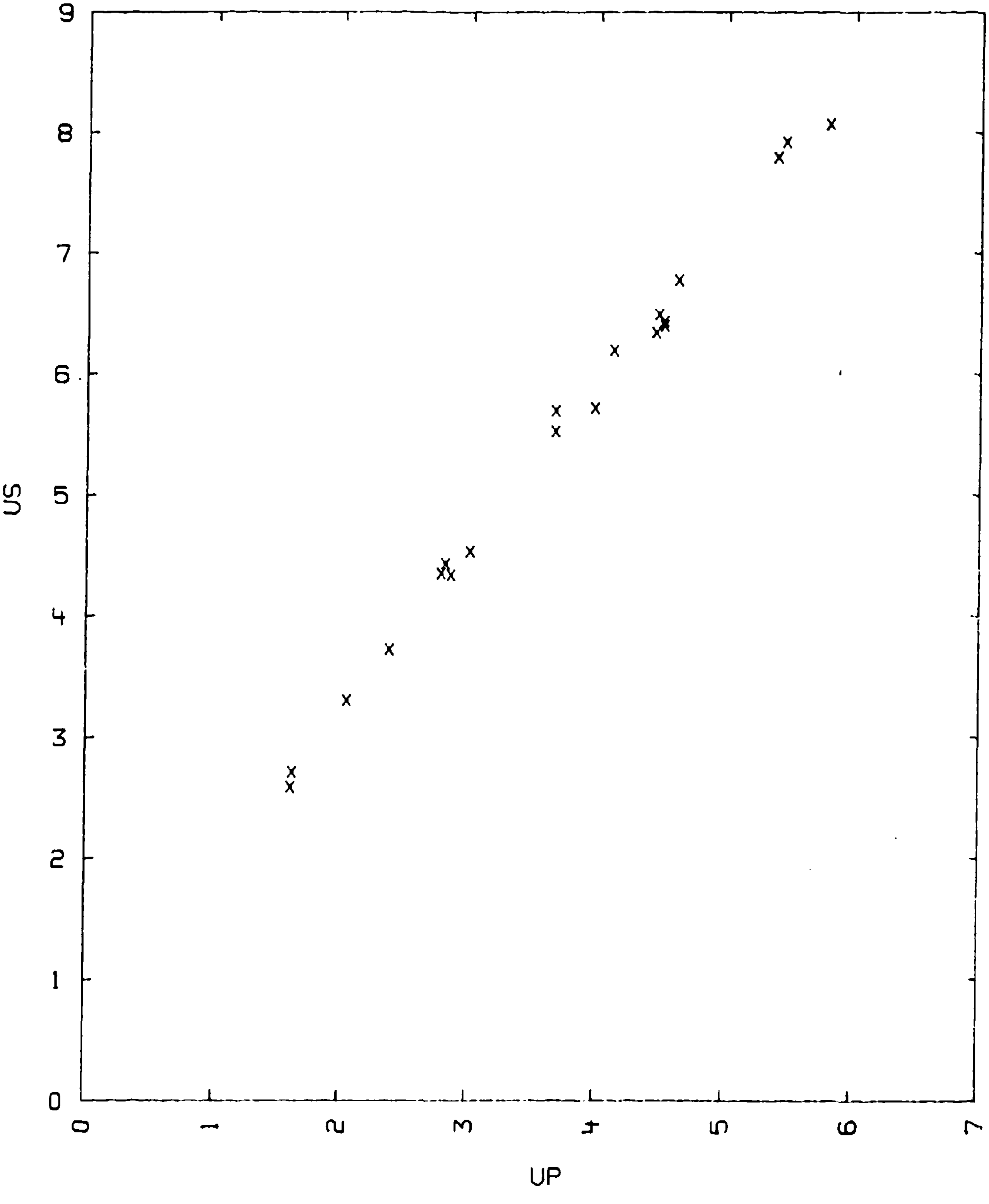
COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.N., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B
3) THE POLYURETHANE COMPOSITION WAS ASSUMED TO BE THE SAME AS ENTRY 23-18-2-1(200-16-286-79)---1

TABLE I

ZERIFAC- POLYURETHANE FOAM

98-29-24-1--23-18-2-1(200-16-2



99-29-24-1--94-29-24-1---1
ANORTHOSITE, TAHAWUS N.Y.

PLAGIOCLASE			90	VOLUME	PERCENT
ANORTHITE	CA-AL2-SI2-08	44		-	-
ALBITE	NA-AL-SI3-08	46		-	-
AUGITE	(NA,CA)(MG,FE,AL)(SI,AL)2-06		10	-	-

VO = 0.362 TO 0.370 CC/G   CL = 6.94 KM/SEC
VOI = 0.364 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE SAMPLE HOLDER AND STANDARD MATERIAL.

TABLE

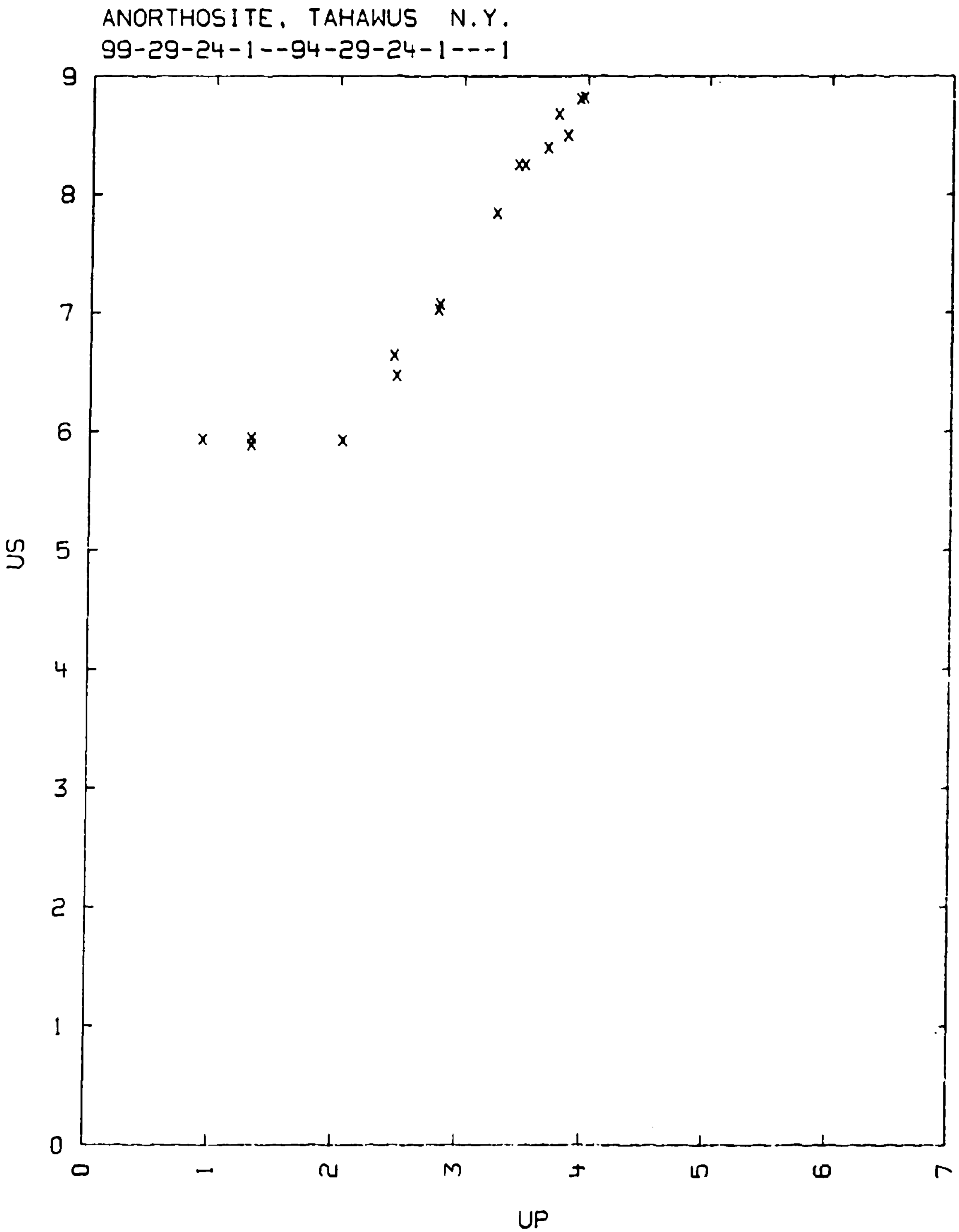
RHOO	US	UP	P	V/VO	US(ST)
2.72	5.93	0.92	148.	0.845	6.52
2.71	5.94	1.31	210.	0.779	6.97
2.73	5.88	1.32	213.	0.776	6.99
2.73	5.92	2.05	331	0.655	7.79
2.71	5.93	2.05	330	0.655	7.80
2.73	6.63	2.45	442	0.630	8.33
2.73	6.46	2.47	435	0.618	8.33
2.72	7.02	2.81	538	0.599	8.78
2.73	7.06	2.82	542	0.601	8.79
2.75	7.84	3.27	704	0.584	9.42
2.76	8.25	3.44	782	0.584	9.68
2.73	8.25	3.50	788	0.576	9.73
2.75	8.39	3.68	849	0.561	9.96
2.79	8.68	3.76	913	0.566	10.12
2.73	8.49	3.84	888	0.549	10.13
2.70	8.80	3.94	937	0.552	10.28
2.72	8.81	3.97	952	0.548	10.33

US = 2.775 + 1.536*UP KM/SEC. FOR UP FROM 2.05 TO 4.0 KM/SEC
SIGMA US = 0.10 KM/SEC.

COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) VOI WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED FOR PLAGIOCLASE IN CRYSTAL DATA DETERMINATIVE TABLES (AMERICAN CRYST. ASSN. 1963) 2ND ED. AND AN ASSUMED AUGITE DENSITY OF 3.2 G/CC
4) THE MODAL ANALYSIS OF THESE SAMPLES WHICH WERE OBTAINED THROUGH BIRCH WAS TAKEN FROM: F. BIRCH, J. GEOPHYS. RES., VOL. 65, P.1083 (1960)
5) FURTHER WORK IN PROGRESS
6) CL WAS ALSO LISTED IN THE ABOVE BIRCH PAPER

TABLE I



99-29-24-1--94-29-24-1---2
ALBITITE, SYLMAR, PENN. (SILICATE ROCK)

OLIGOCLASE:			98	VOL.	PERCENT
ALBITE	NA-AL-SI3-O8	86		-	-
ANORTHITE	CA-AL2-SI2-O8	12		-	-
ACTINOLITE	CA2-(MG,FE)5-SI8-O22-(OH)2		2	-	-

V0 = 0.383 CC/G
V0I= 0.3773 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE SAMPLE HOLDER AND STANDARD MATERIAL.

TABLE

RHO0	US	UP	P	V/V0	US(ST)
2.61	5.66	0.92	136.	0.837	6.49
2.61	5.56	1.34	195.	0.759	6.95
2.61	5.82	1.89	287.	0.675	7.58
2.61	5.90	1.97	303.	0.666	7.67
2.61	5.94	2.08	322.	0.650	7.79
2.61	6.31	2.49	410	0.606	8.28
2.61	6.96	2.88	524	0.587	8.80
2.61	7.75	3.35	677	0.567	9.42
2.61	8.09	3.54	747	0.563	9.66
2.61	8.14	3.70	786	0.546	9.86
2.61	8.65	3.95	892	0.544	10.21
2.61	8.69	3.98	904	0.541	10.23

US = 5.32 + 0.280*UP KM/SEC. FOR UP FROM 0.9 TO 2.1 KM/SEC.
SIGMA US = 0.1 KM/SEC

US = 2.404 + 1.581*UP KM/SEC. FOR UP FROM 2.5 TO 4.0 KM/SEC.
SIGMA US = 0.07 KM/SEC

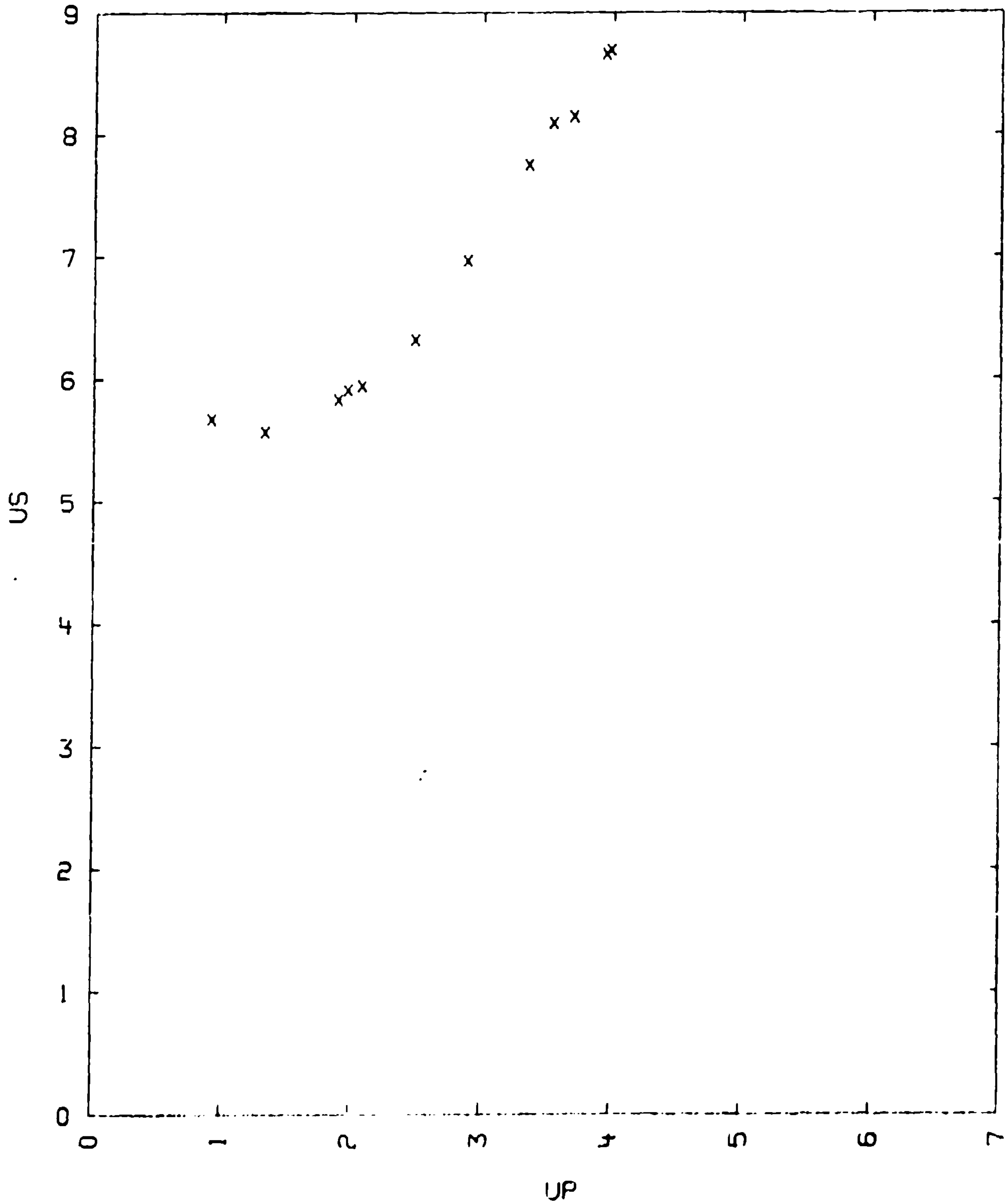
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) V0I WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED IN CRYSTAL DATA DETERMINATIVE TABLES (AMERICAN CRYST. ASSN. 1963) 2ND ED., AND A ACTINOLITE DENSITY OF 3.1 G/CC.
4) THE MODAL ANALYSIS OF THESE SAMPLES WHICH WERE OBTAINED THROUGH BIRCH WAS TAKEN FROM F. BIRCH, J. GEOPHYS. RES., VOL. 65, P. 1083 (1960)
5) FURTHER WORK IS IN PROGRESS.
6) THE DATA SUGGEST A PHASE TRANSITION AT US = 8.2 KM/SEC.

TABLE I

ALBITITE, SYLMAR, PENN. (SILICATE ROCK)

99-29-24-1--94-29-24-1---2



99-29-24-1--94-29-24-1---3

ANDESITE (ANORTHOSITE) (SILICATE ROCK)

ANDESINE:			98 VOLUME PERCENT	1-8MM GRAINS
ALBITE	NA-AL-SI3-08	70-50	-	-
ANORTHITE	CA-AL2-SI2-08	30-50	-	-
APATHITE	CA5(F,CL,O-H)(P-OY)3		REMAINDER	0.01-0.03 MM GRAINS
ZIRCON	ZR-SI-04		-	- - - -
CHLORITE	MG3(SI4-010)(O-H)2-MG3(O-H)6		-	- - - -
HORNBLENDE			-	- - - -

VO = 0.375-0.362

VOI= 0.373-0.369 CC/G

THE TABLE LISTS DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURES IN KILOBARS. AL = 2024 ALUMINUM, BR = 356 BRASS, PLE = PLEXIGLAS

TABLE I

SAMPLE										STANDARD	
RHOO	US1	UP1	P	V1/VO	US2	UP2	UFS2	P2	V2/VO	UFS	MAT
2.662	5.66	0.286	43.	0.950	3.71	0.406		55.	0.915	1.404	PLE
-	5.67	0.293	44.	0.948						1.404	PLE
-	5.86	0.317	49.	0.946	5.28	0.812		111.	0.851	1.560	AL
-	5.40	0.403	58.	0.925	5.18	1.029		144.	0.804	1.97	AL
-	5.77	0.378	58.	0.935	5.38	0.852		126.	0.846	1.97	AL
2.76	6.69	0.280	51.8	0.951	5.25	0.82	1.12	130	0.853	1.55	AL
2.76	6.56	0.158	28.6	0.976	5.62	0.835	1.14	132	0.855	1.58	AL
2.75	6.80	0.300	57.2	0.955	6.10	1.94		330	0.718	3.57	AL
2.73	7.76	0.290	61.5	0.961	6.50	1.88		344	0.742	3.57	AL
2.763	7.22	0.290	57.8	0.959	6.14	1.94	3.84	335	0.689	3.58	AL
2.75	6.59	0.290	52.5	0.956	6.22	2.37	4.65	405	0.621	3.34	BR
2.75	6.81	0.290	54.3	0.957	6.31	2.36	4.38	412	0.628	3.34	BR
2.75	7.03	290	56.1	0.959	6.56	2.38	4.87	432	0.639	4.41	AL
2.75		90	57.6	0.960	6.71	2.57	5.24	476	0.619	4.78	AL

US =

TABLE II

RHOO	US	UP	UFS	P	V/VO	UFS	MAT
2.662	5.63	1.517		227	0.730	2.955	AL
-	5.59	1.320		197	0.764	2.955	AL
-	5.34	0.858				1.560	AL
2.72	6.45	2.27	4.43	400	0.647	3.23	BR
2.75	6.45	2.40	4.77	427	0.628	4.41	AL
2.76	6.73	2.33		433	0.652	3.36	BR
2.75	6.73	2.57	5.33	478	0.618	4.78	AL
2.75	7.33	3.10	6.04	622	0.577	4.45	BR
2.75	7.35	3.10	5.98	623	0.579	4.45	BR

ANDESITE (ANORTHOSITE) (SILICATE ROCK)

RHOO	US	UP	UFS	P	V/VO	UFS	MAT

US =

COMMENTS

1) SOURCE: AHRENS, T. J. AND GREGSON JR, V. G.
J. GEOPHYS. RES., VOL. 69, P. 4839 (1964)
AHRENS, T. J. AND ROSENBERG, T. J.
POULTER LABORATORIES, MENLO PARK, CALIF. USA.
CONFERENCE ON SHOCK METAMORPHISM. APRIL 14-18 (1966)
AHRENS T.J., ROSENBERG J.T. AND RUDERMAN M.H.
STANFORD RESEARCH INSTITUTE REPORT DASA 1868 (1966)
POULTER LABORATORIES, MENLO PARK, CALIF. 94025, USA

2) EXPERIMENTAL TECHNIQUE: C2
DATA REDUCTION METHOD: B, D WITH UFS1=2UP1 (ELASTIC WAVE ONLY)
STANDARDS: 2024 ALUMINUM, PLEXIGLAS AND 356 BRASS.

3) VO1 WAS OBTAINED FROM AN AVERAGE IMPURITY DENSITY AND THE DENSITY RANGE LISTED IN: HURLBUT, C. S., DANAS MANUAL OF MINERALOGY (JOHN WILEY AND SONS INC., NEW YORK 1963) 17TH ED.

4) TWO SINGLE CRYSTALS OF PURE PLAGIOCLASE WERE SHOCKED IN THIS WORK AND GAVE THE FOLLOWING RESULTS:

LABRADORITE (AN50-AN70)		ALBITE (AB100-AB90)	
RHOO = 2.69 G/CC		RHOO = 2.59 G/CC	
US1 = 6.62	UP1 = 0.273	US1 = 6.60	UP1 = 0.188
P1 = 49.	V1/VO = 0.959	P1 = 32	V1/VO = 0.972
US2 = 5.27	UP2 = 0.803	US2 = 4.80	UP2 = 0.802
P2 = 123.	V2/VO = 0.857	P2 = 107	V2/VO = 0.842
NOTE RHO(DANA) = 2.72-2.69		NOTE RHO(DANA) = 2.62-2.64	

ALL UNITS AS IN THE TABLE.

5) SEVERAL POINTS ON THE RELEASE ISENTROPE WERE ALSO MEASURED BY ALLOWING THE WAVE EMERGING FROM THE SAMPLE TO COMPRESS ANOTHER MATERIAL (BUFFER) OR ACCELERATE A THIN BRASS SHIM (BS). THE BUFFERS ARE MAGNESIUM (MG), GLYCEROL (GL), ETHANOL (ET) AND ETHYLETHER (ETE). RELEASE WAVE PRESSURE (P) AND VELOCITITES (UR) FROM SOME OF THE ABOVE HUGONIOT POINTS (PH) ARE:

PH	129.5	132.0	400.0	400.0	433.0	433.0	433.0	433.0	KBAR
P	114.0	31.0	101.0	77.5	232.0	210.0	111.0	168.0	KBAR
UR	1.11	1.18	3.24	3.77	2.51	2.59	2.76	3.20	KM/SEC
BUFFER	MG	ET	BS	BS	MG	GL	ETE	ET	

USING THE ABOVE AND OTHER DATA THE RIEMAN INTEGRAL ALLOWS CALCULATION OF P.V. RELEASE PATHS SHOWING A LARGE HYSTERESIS. SOME SPECIFIC VOLUMES CALCULATED AT P=0 FROM THE CORRESPONDING HUGONIOT POINTS (2ND REF.) ARE:

P	54.0	132	335	424	KBAR
VO	0.344 TO 0.356	0.319	0.355 TO 0.542	0.414 TO 0.534	CC/G

6) THE RELATIVELY LARGE SCATTER IN THE DATA POINTS IS PROBABLY DUE TO

LACK OF UNIFORMITY IN THE SAMPLES AND RELAXATION EFFECTS.
FURTHER WORK IN PROGRESS

TABLE I

ANDESITE (ANORTHOSITE) (SILICATE ROCK)

99-29-24-1--94-29-24-1---3

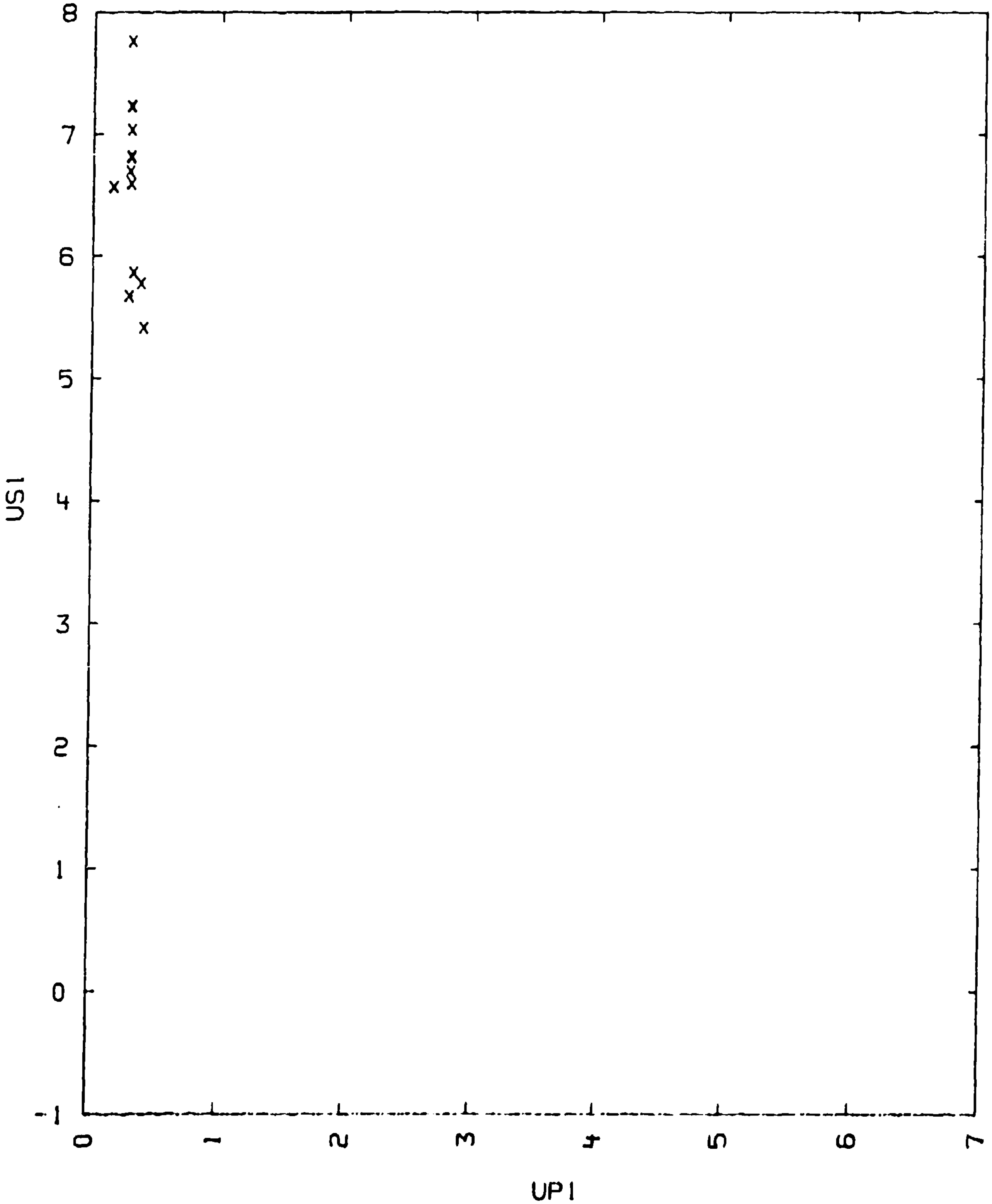


TABLE I

ANDESITE (ANORTHOSITE) (SILICATE ROCK)

99-29-24-1--94-29-24-1---3

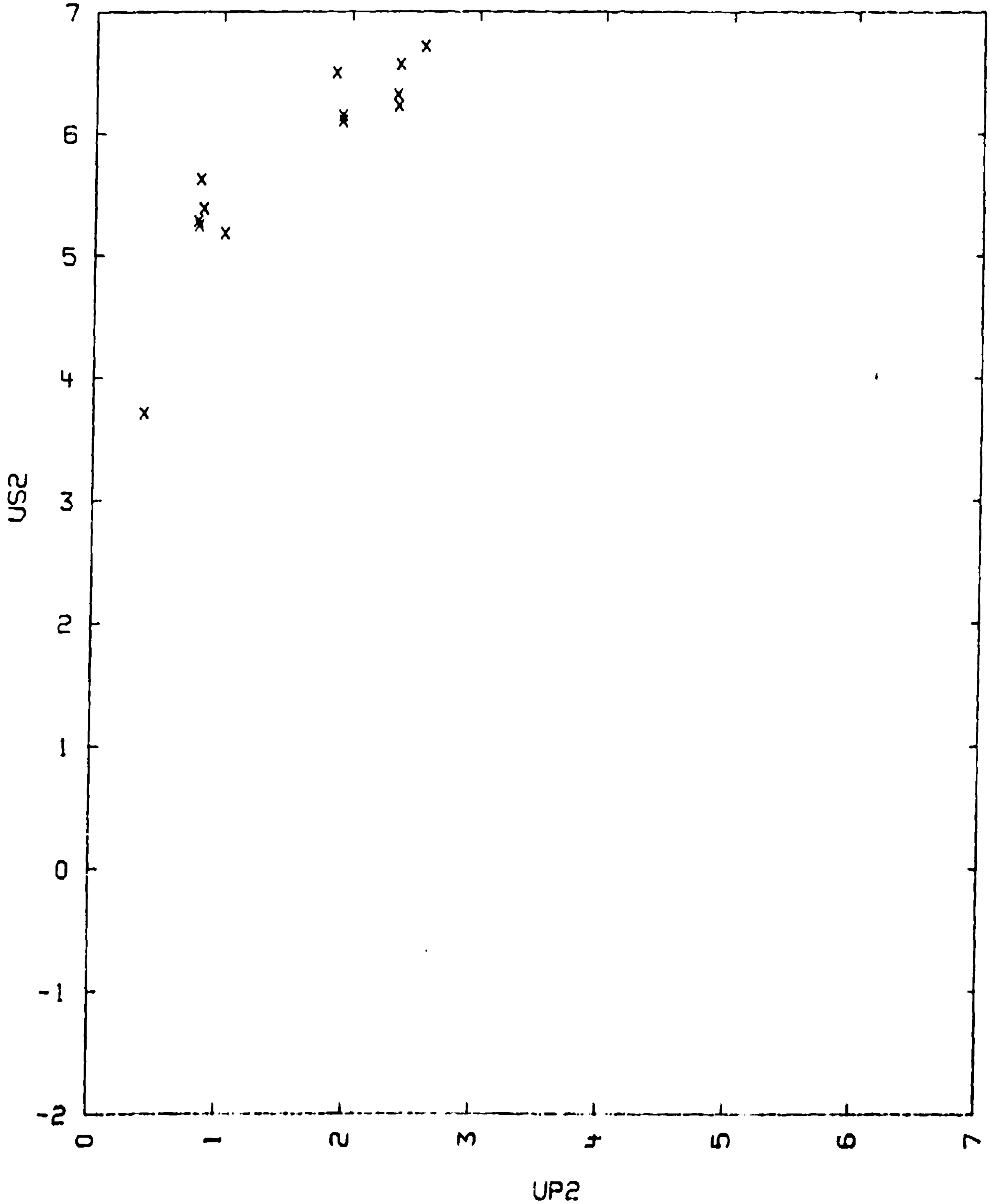
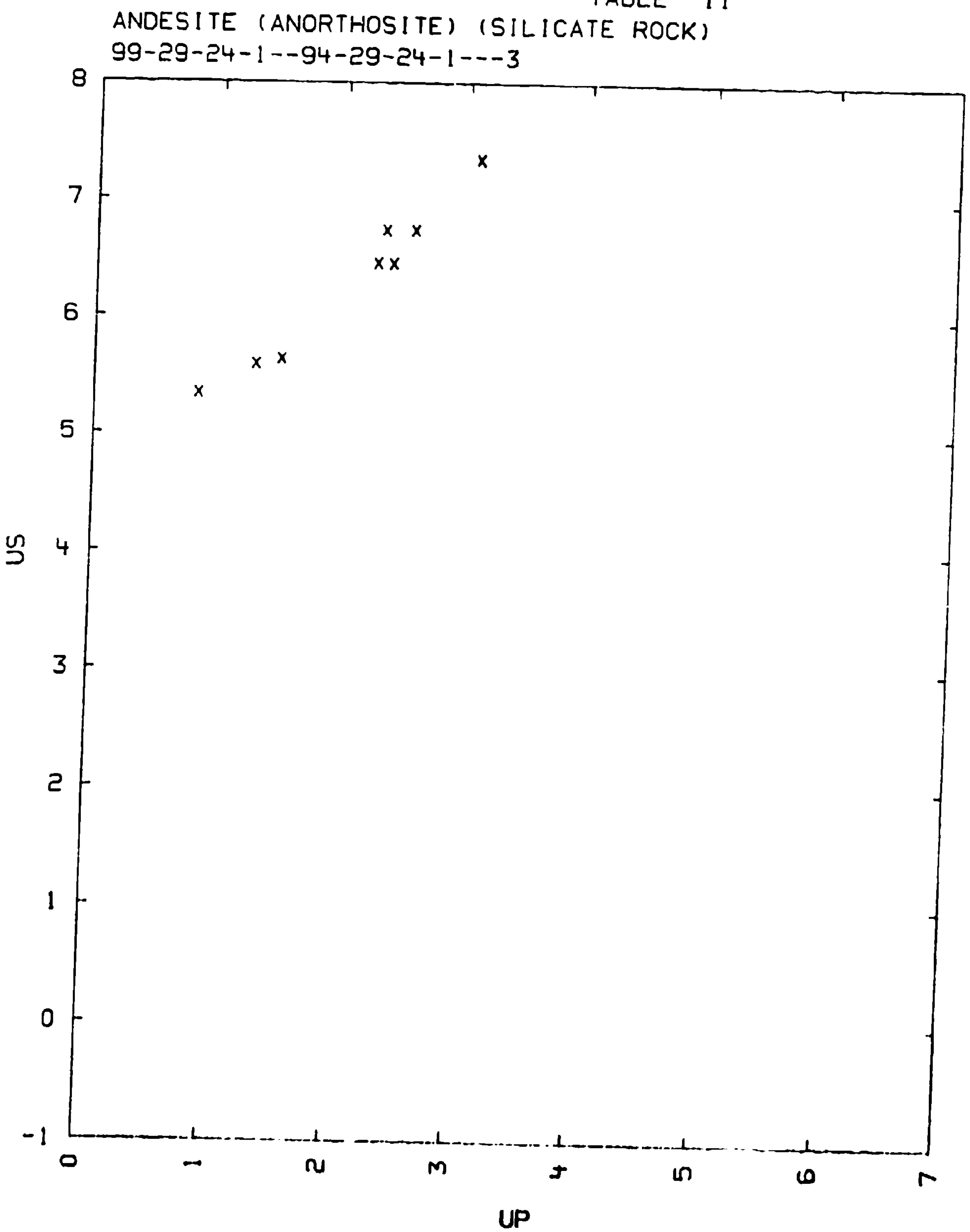


TABLE II



ANDESITE (ANORTHOSITE) (SILICATE ROCK)
99-29-24-1--94-29-24-1---3
US
UP
8
7
6
5
4
3
2
1
0
-1
0
1
2
3
4
5
6
7

99-29-24-1--94-29-24-1---4
OLIGOCLASE (PLAGIOCLASE MUS..AWA)

ALBITE	NA-AL-SI3-O8	75.	MOLE PERCENT
ANORTITE	CA-AL2-SI2-O8	19.	
ORTHOCLASE	K-AL-SI3-O8	5.	
MINOR IMPURITIES		SEE NOTE 4	

V0 = 0.379-0.380 CC/G

TABLE I LISTS RHOO IN G/CC, VELOCITIES IN KM/SEC AND PRESSURES IN KBARS. D IS SAMPLE THICKNESS IN MM. MAT IS THE STANDARD(DRIVER) MATERIAL: AL = DURALUMINUM, BR = 3.. BRASS.

TABLE I

- - - - - - - - - - - - - SAMPLE												STANDARD
RHOO	US1	UP1	P1	V1/V0	US2	UP2	P2	V2/V0	UFS	D		MAT
2.64	7.30	0.196	38.	0.9768	4.80	1.36	183.	0.	2.58	6.472		AL
2.63	7.14	0.195	37.	0.9727	4.91	1.28	177.		2.50	3.190		-
2.64	7.05	0.231	43.	0.9672	5.42	1.85	272.		3.39	6.378		-
2.63	6.82	0.25	44.	0.963	5.42	1.88	275.			3.228		-
2.63	7.24	0.20	38.	0.972	5.76	1.84	285.			3.188		-
2.63	7.61	0.20	40.	0.974	5.38	1.88	275.		3.68	3.188		-
2.64	7.07	0.30	56.	0.958	6.30	2.44	410.		4.74	5.911		-
2.64	7.33	0.28	55.	0.962	6.37	2.45	417.			6.416		-
2.64	7.24	0.29	55.	0.960	6.34	2.48	420.			3.185		-
2.63	7.24	0.29	55.	0.960	6.43	2.47	422.			3.200		-
2.625	7.22	0.29	55.	0.960	6.30	2.49	417.		4.79	3.175		-
2.64	7.13	0.30	56.	0.958	6.74	2.60	464.		5.27	5.911		-
2.63	7.76	3.30	674.	0.575					6.78	3.181		BR

US =

TABLE II LISTS STATES ON SEVERAL RELEASE WAVE PROFILES P U. THE LARGEST P AND SMALLEST U VALUE OF EACH SET OF 2-4 POINTS IS ON THE HUGONIOT.

TABLE II

P	U	P	U	P	U
183.	1.36	272.	1.85	417.	2.45
114.	1.76	173.	2.28	254.	2.94
0.	2.58	112.	2.56	187.	3.42
177.	1.28	0.	3.39	420.	2.48
150.	1.39	275.	1.88	346.	2.59
0.	2.50	216.	1.84	422.	2.47
182.	1.24	285.	1.84	345.	2.59
87.	1.82	213.	1.81		
270.	1.80	410.	2.44		
171.	2.30	260.	2.95		
109.	2.42	166.	3.26		

0. 4.74

COMMENTS:

1) SOURCE: AHRENS T.J., PETERSEN C.F. AND ROSENBERG J.T.
J. GEOPHYS. RES., NO.74, P.2727 (1969)

2) EXPERIMENTAL TECHNIQUE: C1 AND D
DATA REDUCTION METHOD : D (UP1) AND B (UP2)
STANDARDS USED TO OBTAIN THE RELEASE WAVE STATES ARE MAGNESIUM, GLYCERIN, ETHANOL AND WATER. THE SHOCK WAS PASSED THROUGH THE DRIVER, THE SAMPLE AND INTO THE LIQUID WHERE AN IMMERSED FOIL YIELDED VALUES FOR US AND UP LIQUID.(EXP. TECH. D)

3) COMPARISON WITH OTHER FELDSPARS (99-29-24-1---1(2 AND3), 100-29-24-1---1 AS WELL AS ANORTHOSITE (AHRENS SECTION E)) SHOWS A TRANSFORMATION REGION BETWEEN ABOUT 150. AND 400 KBARS.
PHASE COMPOSITIONS AND TEMPERATURE ON THE HUGONIOT AS WELL AS ISENTROPES AND ISOTHERMS HAVE ALSO BEEN CALCULATED BY THE AUTHORS

4) CHEMICAL ANALYSIS INDICATES ABOUT 1 PERCENT OF IRON SILICATE PLUS SOME HYDRATE:

SI-02	63.02,	K2-0	0.05,	TI-02	0.01	WT-PERCENT
AL2-03	27.93,	FE2-03	0.22,	MN-0	0.001	- -
NA2-0	8.55,	H2-0	0.13,	MG-0	0.07	- -
CA-0	3.89,					- -

IN ADDITION 0.03 WT PERCENT OF ADSORBED WATER WAS DRIVEN OF AT 110 DEG. C.

TABLE I

OLIGOCLASE (PLAGIOCLASE MUSKAWA)

99-29-24-1--94-29-24-1---4

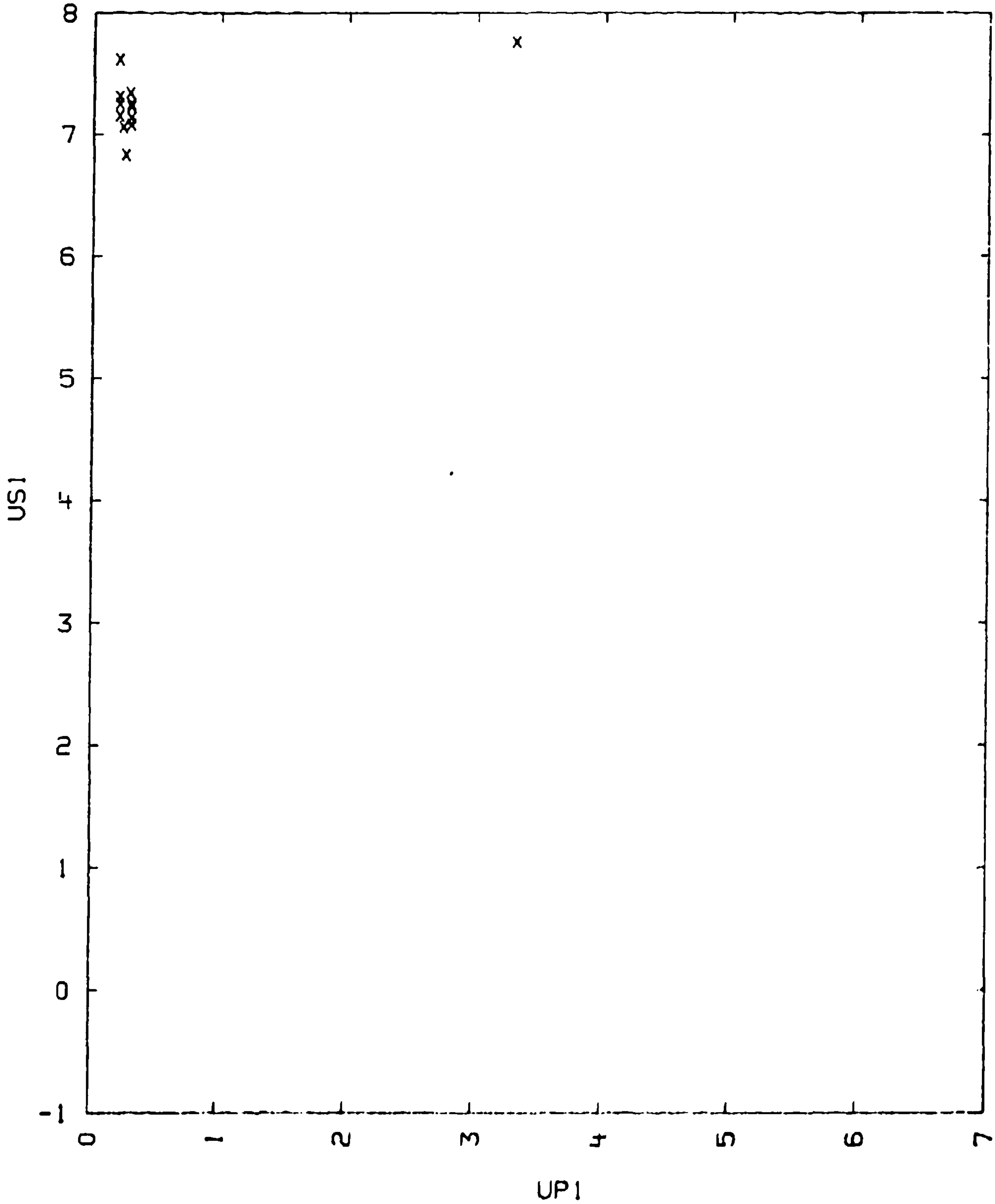
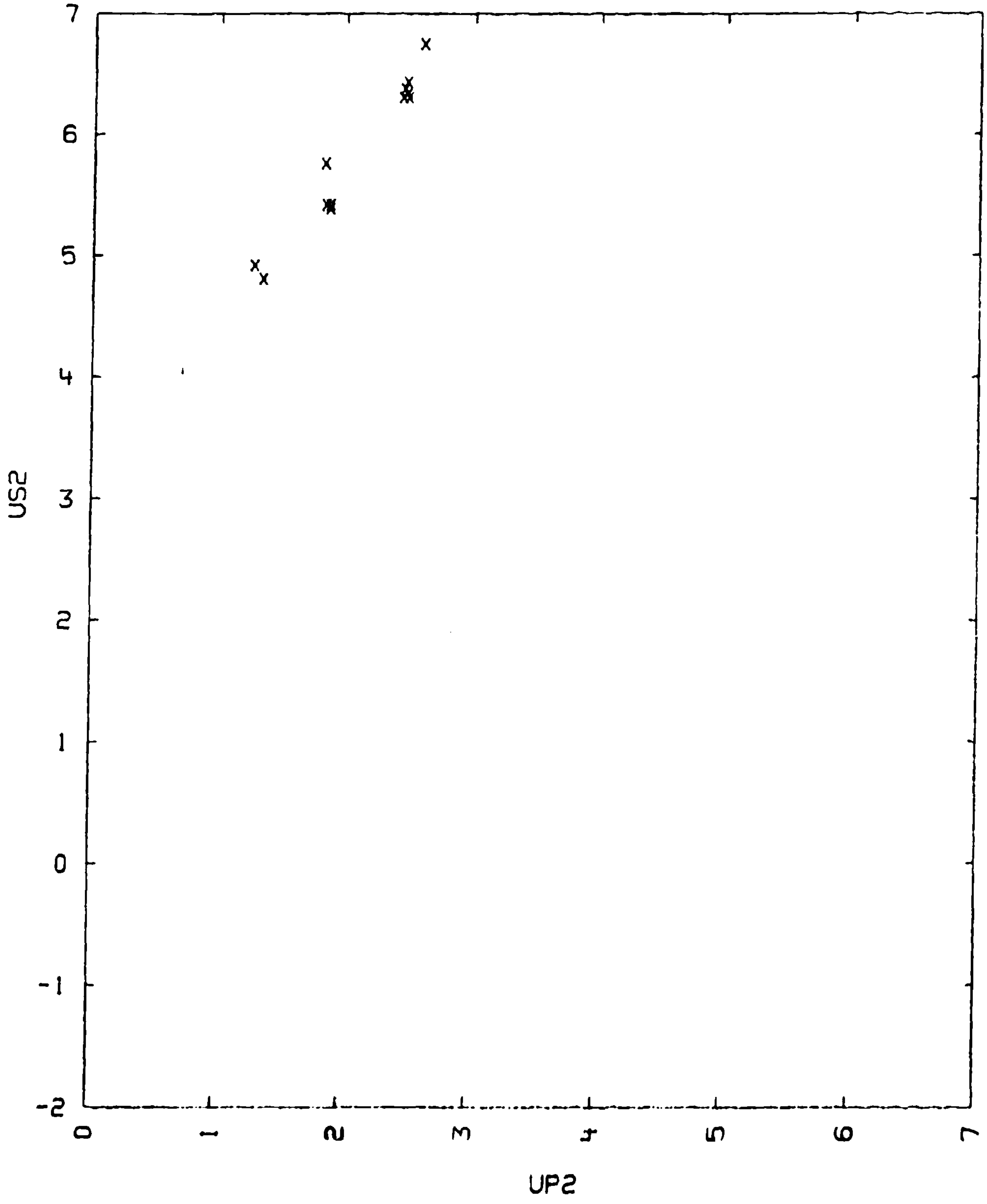


TABLE I

OLIGOCLASE (PLAGIOCLASE MUSKAWA)

99-29-24-1--94-29-24-1---4



99-29-24-1--94-29-24-1--24-1---1
GRANITE, SHOAL

PLAGIOCLASE	(AN)X-(AB)Y	41.0 PERCENT BY WT
QUARTZ	SI-O2	26.8 PERCENT
ORTHOCLASE	K-AL-SI3-O8	
AND MICROCLINE		17.7 PERCENT
BIOTITE		9.1 PERCENT
MICROPERTHITE		5.4 PERCENT

VO = 0.375 CC/G

THE TABLES LISTS SHOCK AND PARTICLE VELOCITIES IN KM/SEC, PRESSURE IN KBARS AND DENSITY IN G/CC.

TABLE I

RHO0	US	UP	P	V/VO
2.66	5.95	0.00	0.010	0.9999894
2.66	6.10	-	0.011	0.9999889
2.74	6.30	-	0.020	0.9999816
2.65	6.30	-	0.031	0.9999705
2.61	6.30	-	0.057	0.9999449
2.66	5.95	-	0.074	0.9999215
2.66	5.95	-	0.075	0.9999205
2.72	5.30	-	0.125	0.9998364
2.7	5.92	0.19	26.5	0.978
3.0	5.74	0.11	18.0	0.982
2.4	6.30	0.23	38.0	0.960

US =

TABLE II

RHO0	US1	UP1	P1	V1/VO	US2	UP2	P2	V2/VO
2.82	5.80	0.25	38.0	0.960	4.75	0.26	41.5	0.954
2.65	5.98	0.24	38.0	0.960	3.566	0.870	94.7	0.779
	-	-		-	3.932	0.898	103.8	0.790
	-	-	-	-	3.993	0.985	113.9	0.770
	-	-	-	-	4.054	0.916	107.8	0.791
	-	-	-	-	4.481	1.171	145.6	0.750
	-	-	-	-	4.572	1.128	142.8	0.764
	-	-	-	-	4.663	1.195	152.4	0.752
	-	-	-	-	4.663	1.291	164.9	0.732
	-	-	-	-	4.968	1.500	200.9	0.705
	-	-	-	-	5.029	1.471	193.9	0.722
	-	-	-	-	5.182	1.481	205.6	0.719
	-	-	-	-	5.334	1.471	209.5	0.728
	-	-	-	-	5.425	1.965	283.3	0.641
	-	-	-	-	5.791	2.047	313.2	0.648
	-	-	-	-	5.882	1.672	257.0	0.714
	-	-	-	-	6.035	1.296	205.1	0.785
	-	-	-	-	6.126	2.380	384.1	0.611

GRANITE, SHOAL

RHO0	US1	UP1	P1	V1/V0	US2	UP2	P2	V2/V0

US =

COMMENTS:

1) SOURCE: DENNEN, R.S.
J.APPL.PHYS., VOL.40 P.3326 (1969)
J.APPL.PHYS., VOL.41 P.5309 (1970)
2) EXPERIMENTAL TECHNIQUE: A FOR PRESSURES BELOW 42 KBAR
FOR PRESSURES ABOVE 50 KBAR A SHADOWGRAPH
OF THE FREE SURFACE OF A WEDGE SHAPED SAMPLE WAS USED.
DATA REDUCTION TECHNIQUE: A FOR PRESSURES BELOW 42 KBAR
D FOR PRESSURES ABOVE 50 KBAR
C FOR PRESSURES BELOW 0.13 KBAR
3) THE POINTS BELOW 0.13 KBAR WERE OBTAINED WITH A SHOCK TUBE AND A GAS STANDARD
4) POISSON'S RATIO FOR GRANITE WAS USED TO CALCULATE UP FROM THE FREE SURFACE MOTIONS OF THE WEDGE. THE VALUE USED WAS FROM F.BIRCH, J.GEOL. VOL.48,P.752 (1940)
5) PETROGRAPHIC COMPOSITION OF SHOAL GRANITE WAS REFERENCED AS A PRIVATE COMMUNICATION FROM R.S.YOUNG.
6) NO DATA ON GRAIN SIZE REPORTED
7) RHO0 WAS NOT LISTED BY AUTHOR BUT RECALCULATED FROM HIS DATA

TABLE I

GRANITE, SHOAL

99-29-24-1--94-29-24-1--24-1--

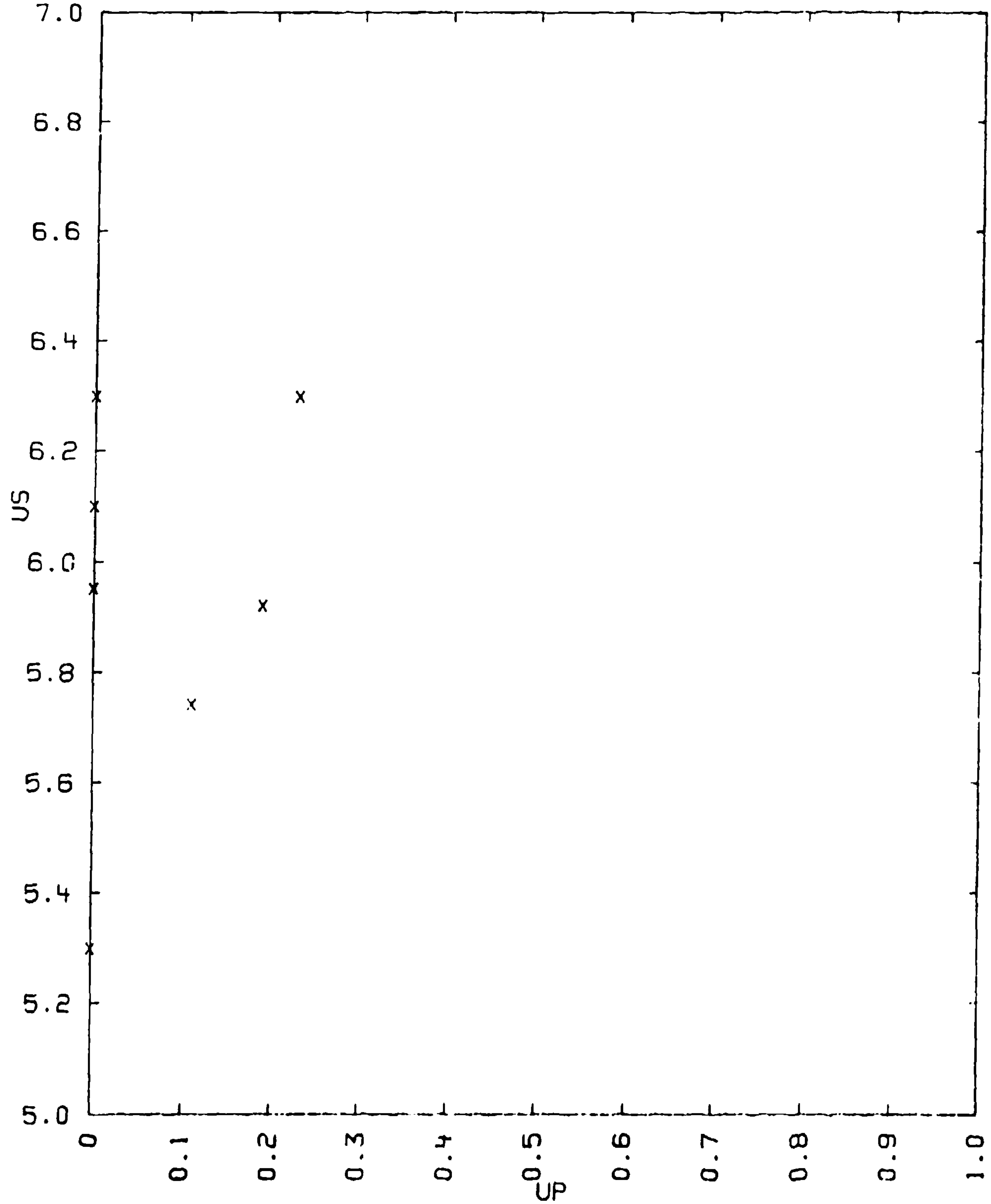
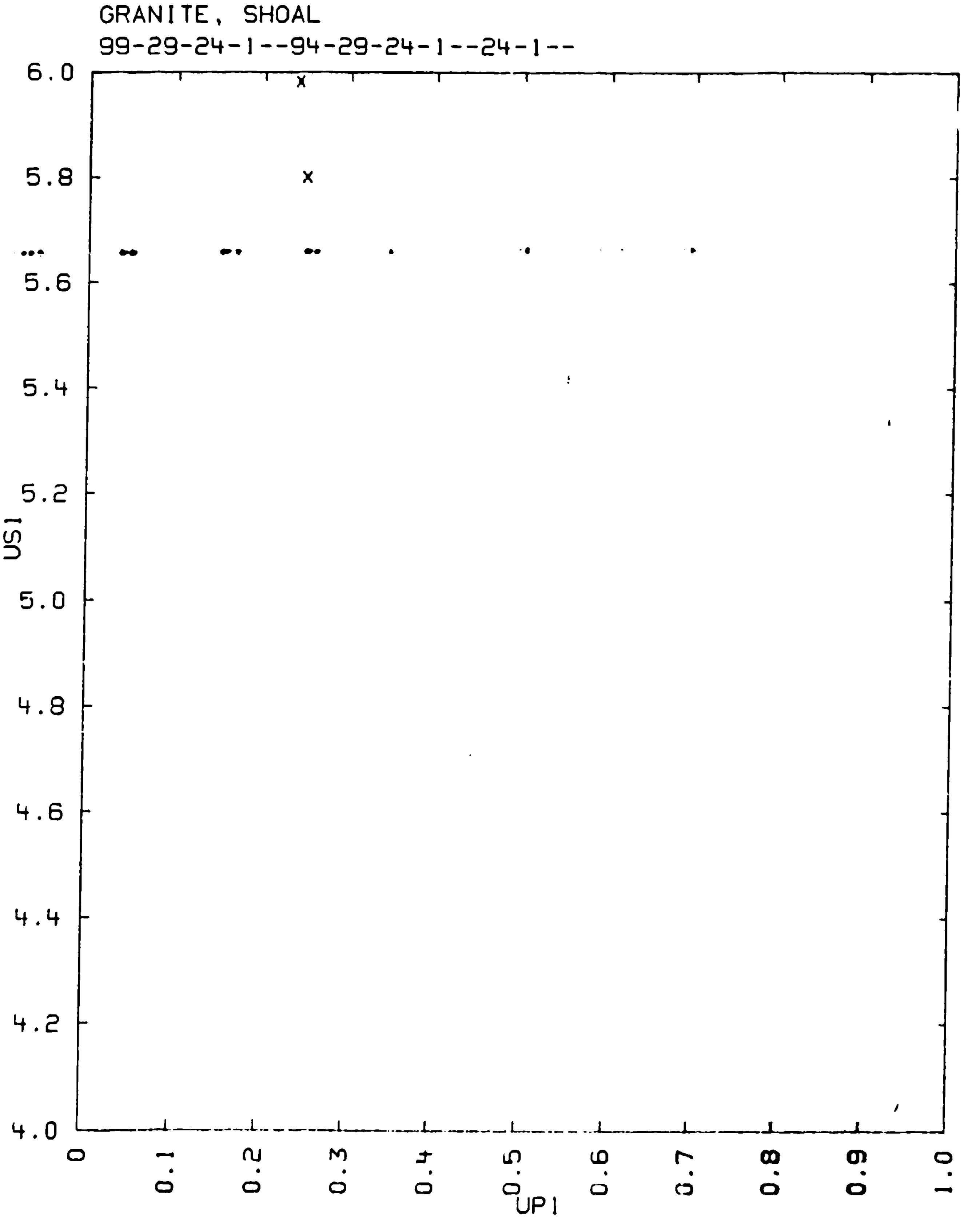


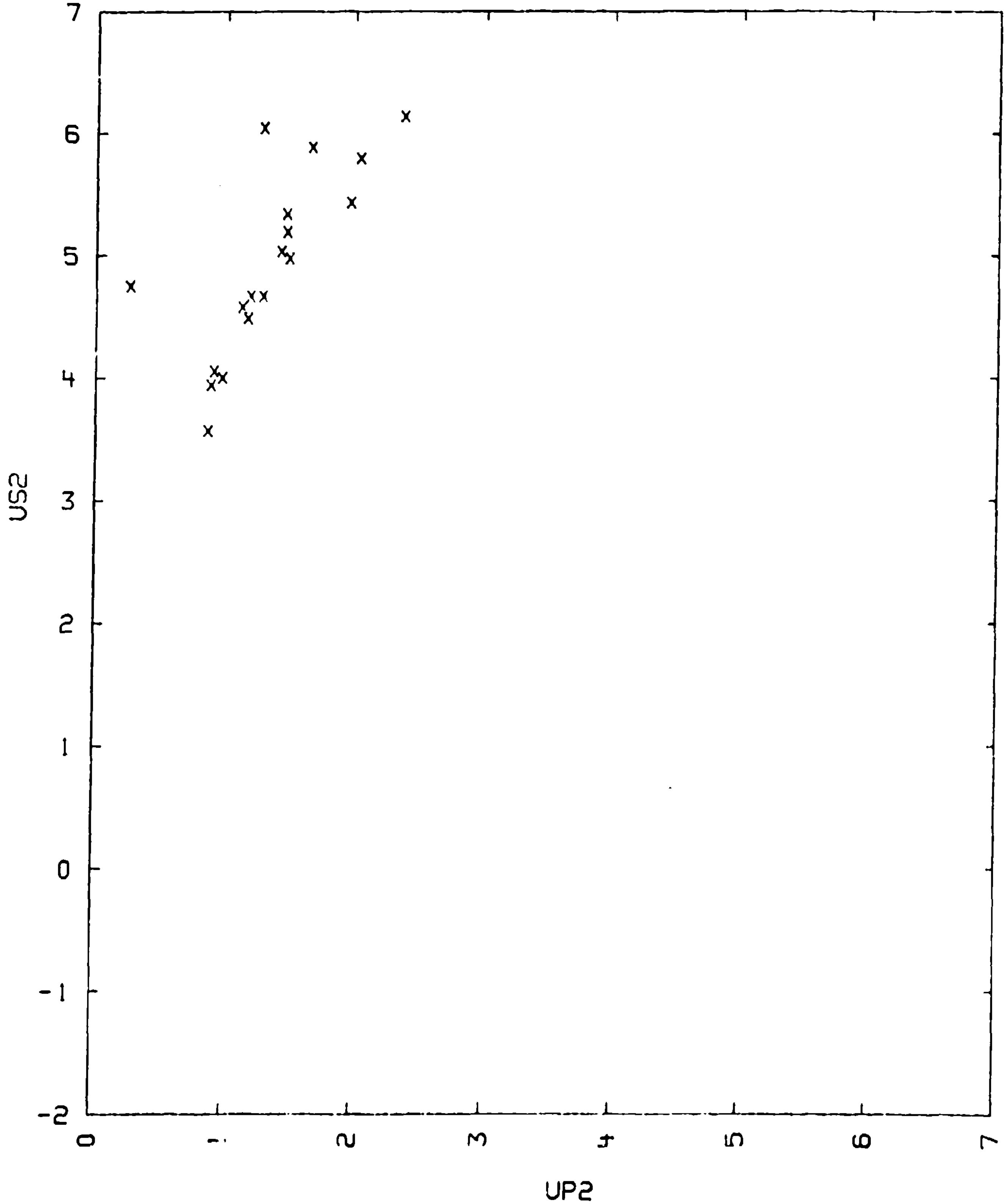
TABLE II



GRANITE, SHOAL
99-29-24-1--94-29-24-1--24-1--
6.0
5.8
5.6
5.4
5.2
5.0
4.8
4.6
4.4
4.2
4.0
US1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
UP1

TABLE II

GRANITE, SHOAL
99-29-24-1--94-29-24-1--24-1--



99-29-24-1--94-29-24-1--24-1--100-29-24-1---1
GRANITE

PLAGIOCLASE	(AB)X-(AN)Y	46.7	VOL.	PERCENT.
QUARTZ	SI-O2	21.1	-	-
ORTHOCLASE	K-AL-SI3-O8	20.3	-	-
BIOTITE	K(MG,FE)3-(AL-SI3-O10)-(O-H)2	4.9	-	-
CHLORITE	MG3(SI4-O10)-(O-H)2-MG3(O-H)6	6.5	-	-
OPAQUES	FE, O AND S	0.5	-	-
POROSITY		0.9	-	-

VO = 0.373 CC/G
VOI =

THE TABLE LISTS VELOCITIES IN KM/SEC, PRESSURE IN KBAR, AND DENSITY IN G/CC.

TABLE

---- - SAMPLE				-------	STANDARD
RHOO	US	UP	P	V/VO	MAT.
2.68	11.93	6.01	1921.	0.496	FANSTEEL
-	10.67	5.21	1480.	0.510	-
-	10.22	4.90	1340.	0.521	-
-	10.11	4.86	1327.	0.519	-
-	9.00	4.05	986.	0.550	CU
-	8.66	4.01	930.	0.537	-
-	7.27	3.17	627.	0.564	-

US = 2.22 + 1.625*UP KM/SEC.
SIG.US = 0.11 KM/SEC.

COMMENTS:

1) SOURCE: ISBELL, W.M.
PAPER PRESENTED AT DASA SPONSORED MEETING
AT THE RAND CORPORATION, SANTA MONICA, CALIFORNIA,
OCTOBER 26-28 (1965)
CONTRACT DA-49-146-XZ-429
GENERAL MOTORS TECHNICAL CENTER, WARREN, MICH., U. S. A.

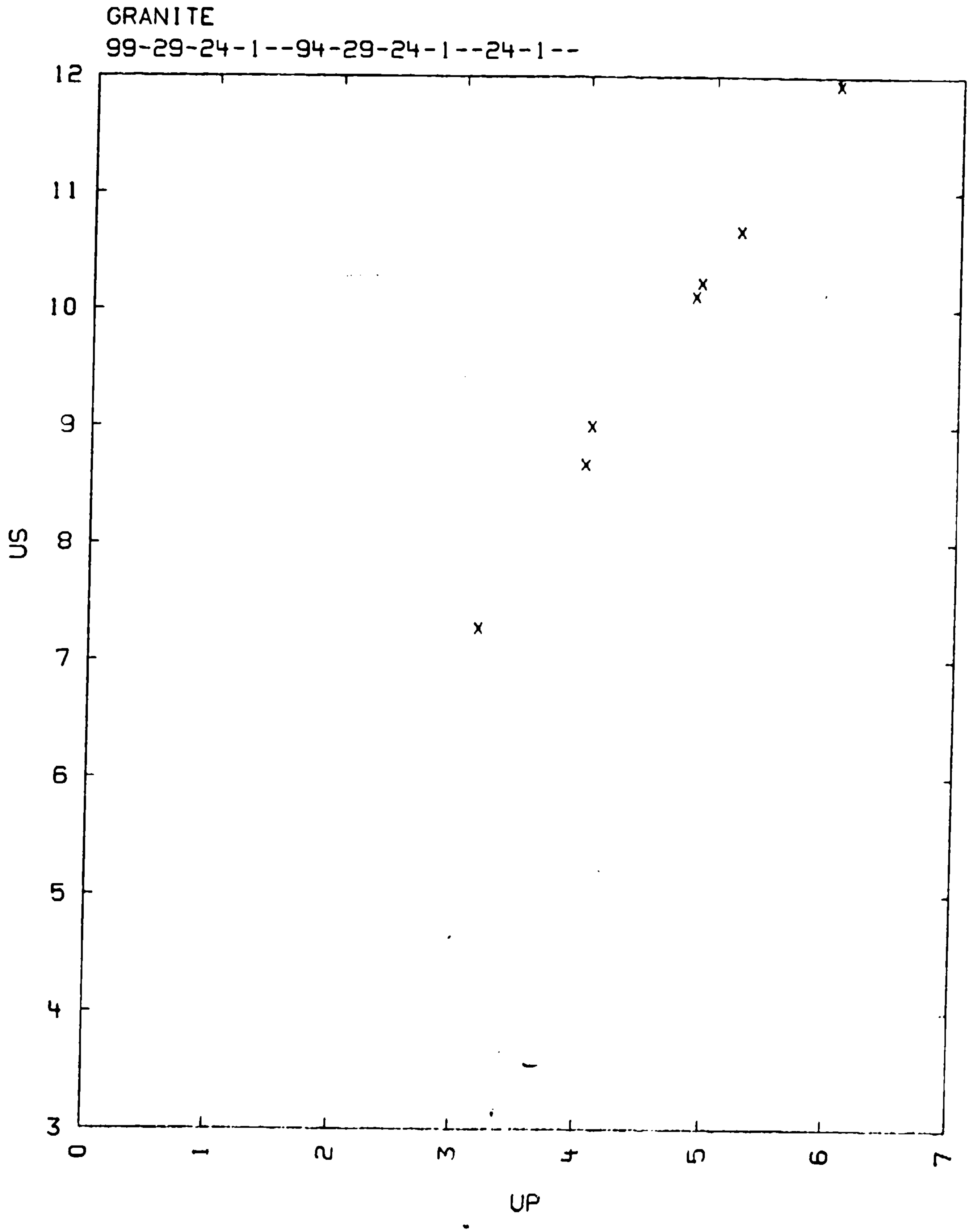
2) EXPERIMENTAL TECHNIQUE: A. FOR SHOCK VELOCITY MEASUREMENTS, TWO TIMED X-RAY FLASHES DETERMINE VELOCITY OF THE PROJECTILE.
DATA REDUCTION METHOD: A. STANDARD PROJECTILES: FANSTEEL-77 AND OXYGEN FREE HIGH CONDUCTIVITY COPPER

3) THE MODAL ANALYSIS OF ROCK SAMPLES FROM THE SAME LOCATION GIVEN ABOVE WAS MADE BY:
H. BARNES TECHNICAL LETTER: NTS-185, JUNE 21 (1967), ALSO
PRIVATE COMMUNICATION 1968
U. S. DEP. OF THE INTERIOR, GEOLOGICAL SURVEY
FEDERAL CENTER, DENVER, COLORADO 80225, U. S. A.

4) THIS SAME REPORT LISTS FOR A DUPLICATE ROCK WITH SIMILAR COMPOSITION
BULK MODULUS (ISOTHERMAL) 0.355 MBAR

SHEAR -	-	0.244 MBAR
POISSONS RATIO		0.22

TABLE I



99-29-24-1--94-29-24-1--93-41-24-1---1
BASALT

PLAGIOCLASE	(AN)X-(AB)Y	70.0 PERCENT BY WT.
OLIVINE	(MG-FE)2-SI-O4	24.5 PERCENT
MAGNETITE AND OPAQUES	FE3-O4 +	5.5 PERCENT
POROSITY(MEASURED)		4.9 PERCENT
PARTICLE SIZE		UP TO 0.5 MM

VO = 0.374 CC/G   CL = 5.36 KM/SEC
CS = 3.10 KM/SEC

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UFS	UP	P	V/VO
2.667	7.79	6.10	3.29	684	0.578
2.673	4.87	1.59	0.79	103	0.837
2.668	5.24	3.02	1.67	233	0.681
2.654	8.59	6.71	3.50	797	0.593
2.682	5.25	2.71	1.53	215	0.709
2.693	5.70	3.83	2.10	322	0.633
2.688	6.93	5.54	2.86	533	0.588

US =

COMMENTS:

1) SOURCE: COMPILER
   L. R. L. EQUATION OF STATE FILE
   S DIVISION REPORT STN 71, AUG 1964
   LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B
   DATA REDUCTION TECHNIQUE B
   (STANDARD MATERIAL 2024 ALUMINUM)
3) THE TABLE LISTS RESULTS FOR TWO TYPES OF BASALT FROM NATIONAL TEST SITE, NEVADA.
   THE FIRST FOUR POINTS CORRESPOND TO SAMPLES FROM BUCKBOARD HOLE NO. 3 AT 36 FOOT DEPTH.
   THE OTHER THREE POINTS CORRESPOND TO SAMPLES FROM AREA 18 IN THE VICINITY OF BUCKBOARD DRILL CORE.
4) A MORE EXTENSIVE DISCUSSION OF THIS MATERIAL MAY BE FOUND IN REPORT UOPK B 64-2 JAN 1964 BY L. ROGERS, LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
5) BOTH TYPES OF BASALT HAVE THE SAME PARTICLE VS. SHOCK VELOCITY DEPENDENCE WITHIN EXPERIMENTAL ERROR.
6) CHEMICAL ANALYSIS

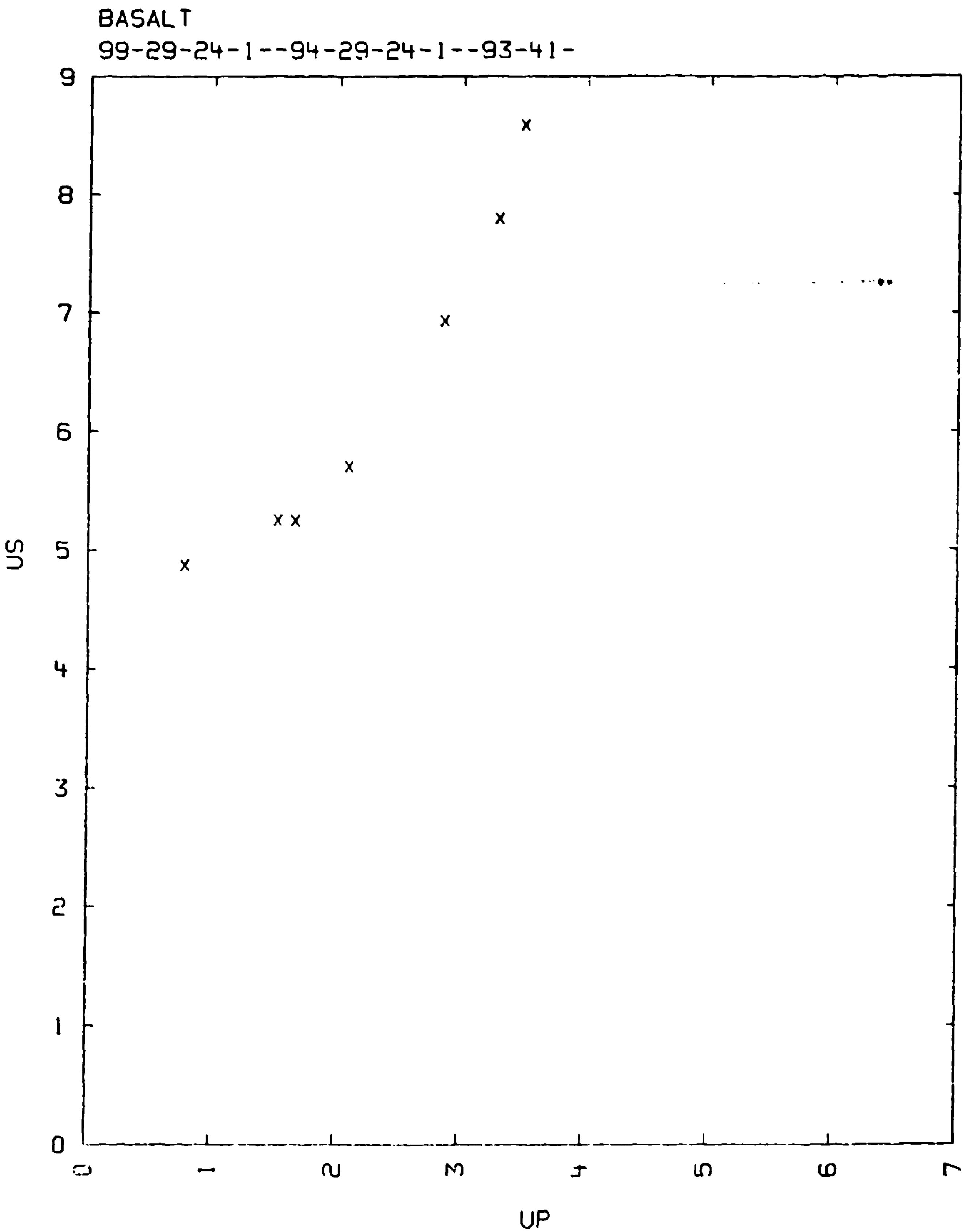
SILICA	51.88 PERCENT BY WEIGHT
FERRIC OXIDE	9.37 PERCENT
ALUMINUM OXIDE	17.56 PERCENT

CALCIUM OXIDE	6.74 PERCENT
MAGNESIUM OXIDE	5.54 PERCENT
SODIUM OXIDE	4.26 PERCENT
POTASSIUM OXIDE	2.34 PERCENT
TITANIUM DIOXIDE	1.32 PERCENT
BARIUM OXIDE	0.42 PERCENT
WATER	0.18 PERCENT

7) THE CHEMICAL ANALYSIS INDICATES THAT THE PLAGIOCLASE CAN BE IDENTIFIED AS ANDESINE.

8) MINERALOGICAL AND CHEMICAL ANALYSIS COMPARE QUITE FAVORABLY TO EACH OTHER PROVIDING THAT THE OPAQUES CONSIST OF MINERALS THAT ARE PARTIALLY COMPOSED OF POTASSIUM, TITANIUM, BARIUM, AND HYDROGEN, SINCE THESE ELEMENTS ARE NOT PART OF PLAGIOCLASE, OLIVINE, OR MAGNETITE, WHICH ACCOUNT FOR 74.5 PERCENT OF MINERALOGICAL ANALYSIS.

TABLE I



99-29-24-1--94-29-24-1--99-94-93-41-29-24-1---1
BASALT, VACAVILLE (SILICATE ROCK)

ANDESINE:		53	VOLUME PERCENT
ANORTHITE CA-AL2-SI2-O8	24-28	-	-
ALBITE NA-AL-SI3-O8	29-25	-	-
AUGITE (CA,NA)(MG-FE-AL)(SI,AL)2-O6		31	-
MAGNETITE-ILMENITE FE2-O3 - FE-TI-O3		9	-
CELADONITE K(MG-FE)(AL-FE)-SI4-O10(OH)2		5	-
APATITE CA5(F,CL,O-H)(P-O4)3		2	-
GRAIN SIZE:		0.01-0.2 MM.	

V0 = 0.355 CC/G
V0I= 0.329-0.315 CC/G

THE TABLE LISTS DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURES IN KBARS.

TABLE

SAMPLE									STANDARD
RHO0	US1	UP1	P1	V1/V0	US2	UP2	P2	V2/V0	UFS
2.82					5.31	0.964	145	0.820	1.968
-	5.43	0.328	50	0.940	5.19	0.906	134	0.828	-
-					5.06	0.798	116	0.845	(1.64)
-	5.33	0.291	44	0.945	5.12	0.764	112	0.854	-
-					5.44	1.232	189	0.775	(2.61)
-	5.55	0.323	50	0.942	5.40	1.124	172	0.793	-

US =

COMMENTS:

1) SOURCE: AHRENS, T. J. AND GREGSON JR, V. G.
J. GEOPHYS. RES., VOL. 69, P. 4839 (1964)
2) EXPERIMENTAL METHOD C2
DATA REDUCTION TECHNIQUE B AND D WITH 2UP=UFS FOR THE FIRST WAVE
3) V0I WAS OBTAINED FROM THE DENSITY RANGES GIVEN BY HURLBUT, C. S., DANAS MANUAL OF MINERALOGY (JOHN WILEY, N.Y. 1963) 17TH ED.
4) SOME TABULATED LINES SHOW NO FIRST WAVE. HERE THE FIRST WAVE OF THE FOLLOWING LINE WAS USED IN THE CALCULATION OF P2 AND V2/V0, SINCE THAT LINE WAS OBTAINED IN THE SAME EXPERIMENT.

TABLE 1

BASALT, VACAVILLE (SILICATE ROCK)

99-29-24-1--94-29-24-1--99-94-

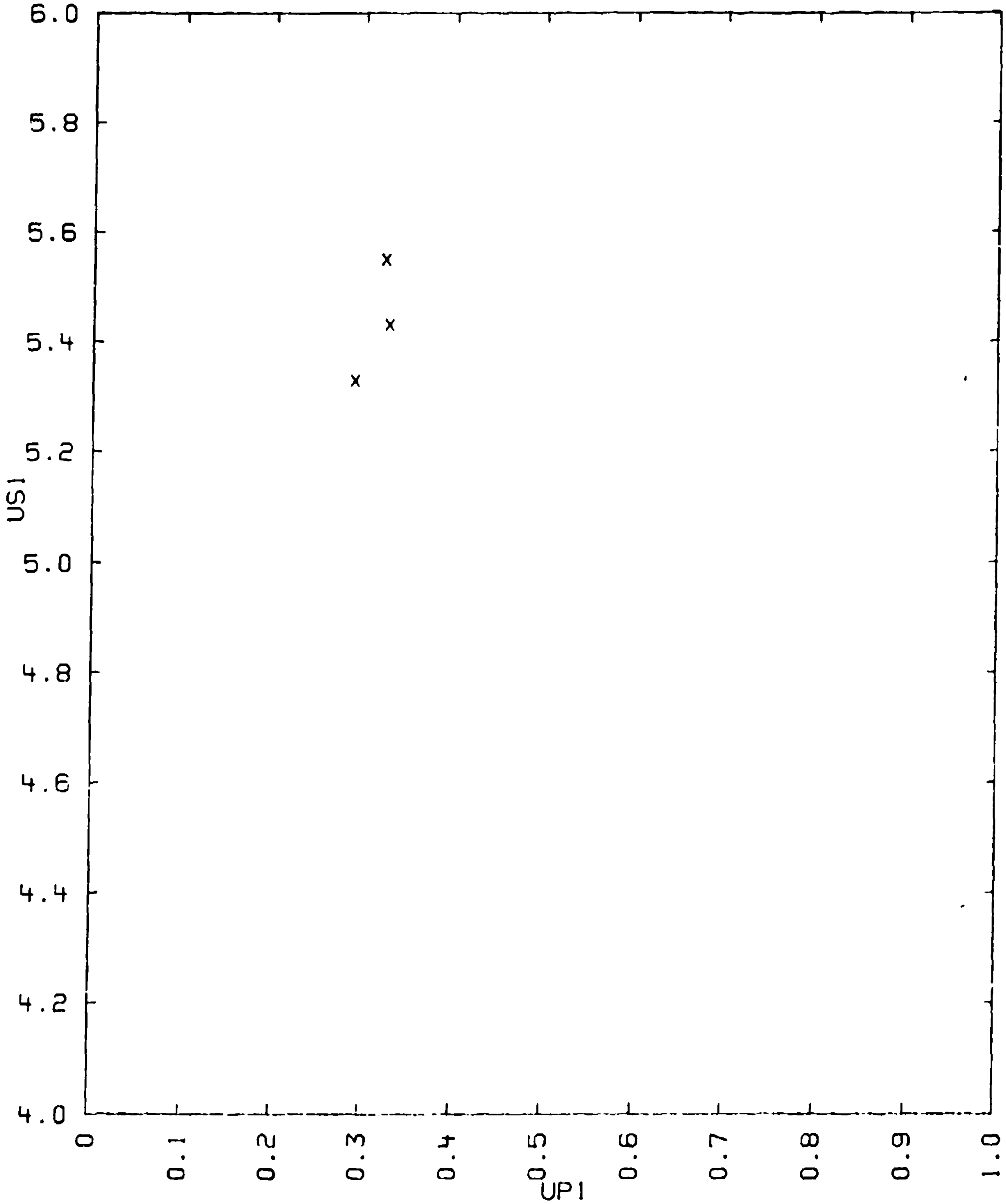
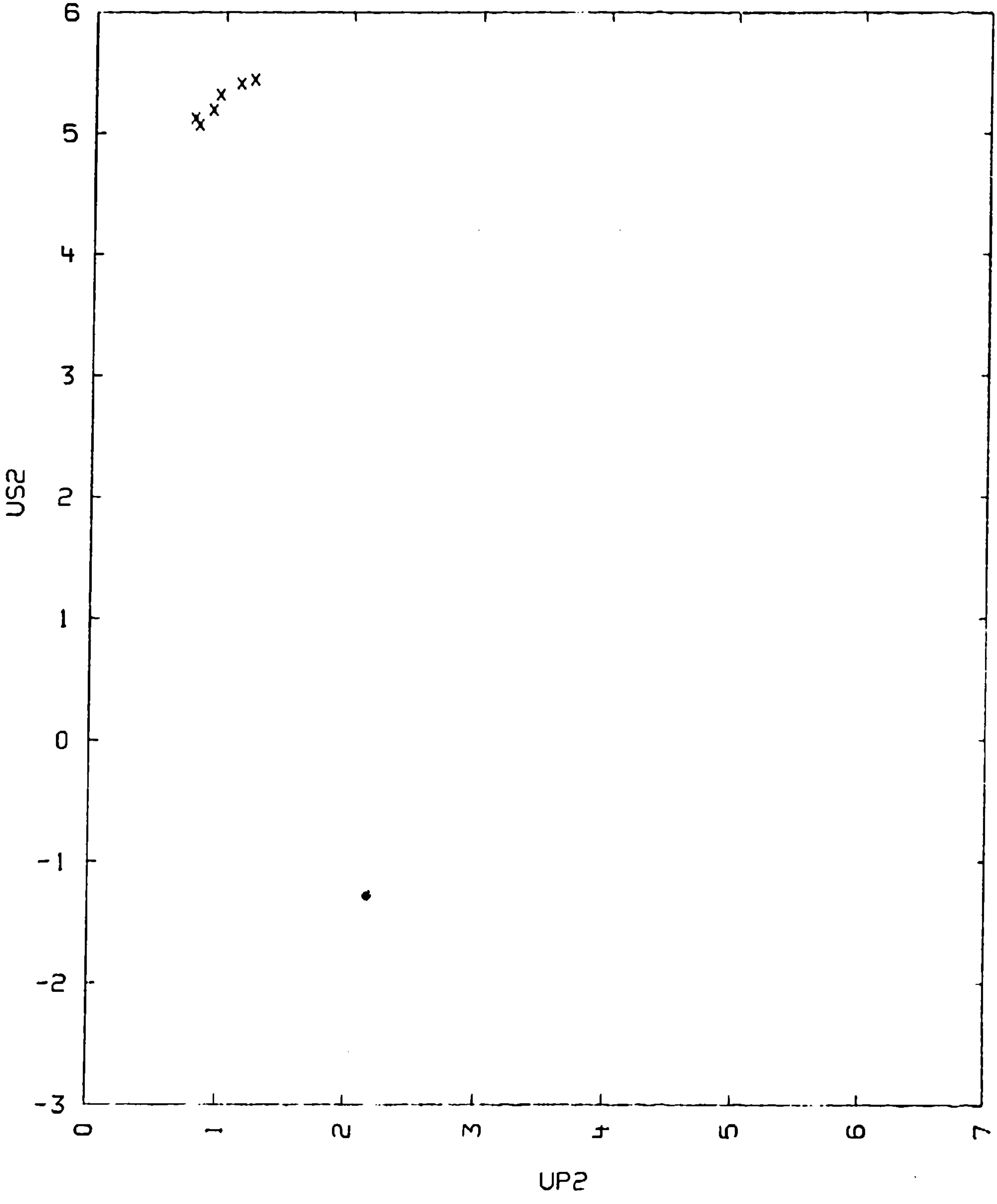


TABLE I

BASALT, VACAVILLE (SILICATE ROCK)

99-29-24-1--94-29-24-1--99-94-



99-29-24-1--94-29-24-1--99-94-93-41-29-24-1---2
BASALT, VACAVILLE

PLAGIOCLASE FELDSPAR:		53 VOLUME PERCENT
ANORTHITE	CA-AL2-SI2-08	- -
ALBITE	NA-AL-SI3-08	- -
AUGITE	(CA,NA)(MG,FE-FE,AL)(SI,AL)2-06	31 - -
MAGNETITE: FE2-03 AND ILMENITE: FE-TI-03		9 - -
CELADONITE	K(MG-FE)(AL-FE)-SI4-O10(OH)2	5 - -
APATITE	CA5-O-H-(P-04)3	2 - -
GRAIN SIZE		0.3 - 0.003 MM
POROSITY		2.0 PERCENT

V0 = 0.346 CC/G CO = 2.306 KM/SEC.
V0I= 0.329 - 0.315 CC/G.

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES ARE IN KM/SEC. AND PRESSURE IN KILOBARS.

TABLE

RHO0	US	UP	P	V/V0
2.86	5.88	2.10	353.	0.643
-	6.77	2.76	534.	0.592
-	7.59	3.24	703.	0.573
-	8.31	3.94*	936.	0.526
-	9.19	4.25	1117.	0.538
-	9.01	4.33*	1116.	0.520
-	9.91	4.64	1315.	0.532
-	10.60	5.01	1519.	0.529
-	10.63	5.20	1581.	0.511
-	12.04	5.94	2046.	0.507

US = 2.31 + 1.615*UP KM/SEC. SIGMA US = 0.20 KM/SEC.

COMMENTS:

1) SOURCE: JONES, A. H., ISBELL, W. M., SHIPMAN, F. H., PERKINS, R. D., GREEN, S. J. AND MAIDEN, C. J.
INTERIM REPORT, CONTRACT NAS2-3427, 1968
GENERAL MOTORS TECH. CENTER, WARREN, MICHIGAN 48090
2) EXPERIMENTAL TECHNIQUE A:
DATA REDUCTION TECHNIQUE A
STANDARD MATERIALS: OFHC COPPER AND FANSTEEL-77 ALLOY. THE COPPER STANDARD US-UP HUGONIOT RELATIONSHIP IS GIVEN BY:
US = 3.96 + 1.497*UP KM/SEC. RHO0 = 8.93 G/CC
THE FANSTEEL US-UP HUGONIOT IS GIVEN BY:
US = 3.96 + 1.295*UP KM/SEC. RHO0 = 17.01 G/CC
3) THESE PRESSURES WERE ACHIEVED BY USING A TWO-STAGE LIGHT GAS GUN THE PROJECTILE IMPACT VELOCITY AND TILT WERE MEASURED BY TWO TIMED FLASH X-RAY SHADOWGRAPHS OF THE PROJECTILE.
4) THE CHEMICAL COMPOSITION IN WEIGHT PERCENT IS:

SI-O2 = 50.3	PERCENT	CA-O = 7.7	PERCENT	TI-O2 = 2.4	PERCENT
AL2-O3 = 13.8	-	NA2-O = 3.3	-	P2-O5 = 1.2	-
FE2-O3 = 3.5	-	K2-O = 1.6	-	MN-O = 0.24	-
FE-O = 9.1	-	H2O- = 1.0	-	CO2 = 0.05	-
MG-O = 4.4	-	H2O+ = 1.5	-		

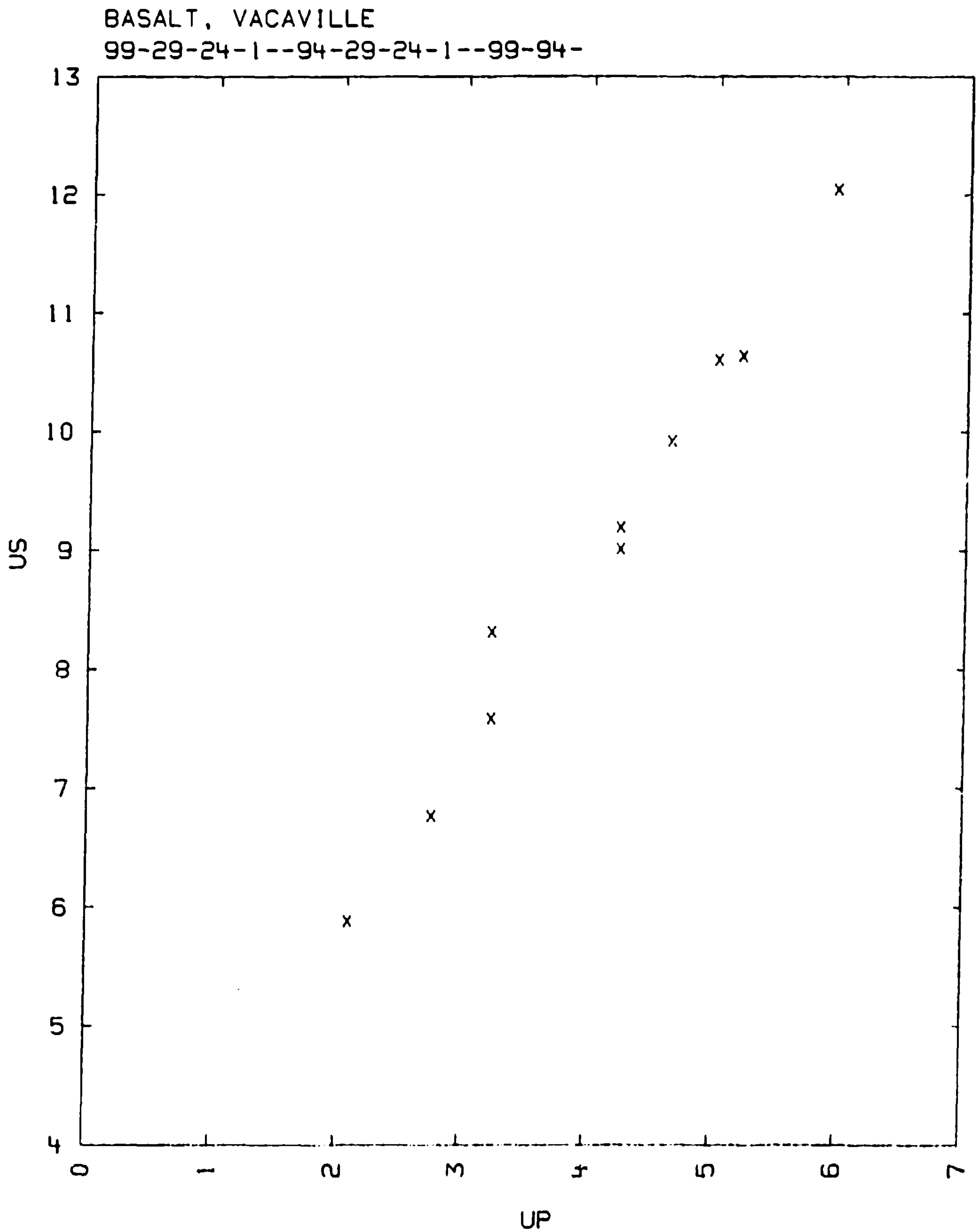
5) OTHER STRENGTH PARAMETERS MEASURED BY THE AUTHORS ARE LISTED BELOW:

	AVERAGE	RANGE	UNITS
COMPRESSIVE STRENGTH	2.56	1.56-3.69	10**9 DYNES/(CM**2)
SHEAR STRENGTH (CALC.)	8.6		10**8
TENSILE STRENGTH	1.42	0.90-2.32	10**8

6) THE ESTIMATED EXPERIMENTAL ERROR IN MEASURING US IS 1 - 4 PERCENT THE UNCERTAINTY IN THE PARTICLE VELOCITIES IS 0.2 PERCENT EXCEPT FOR THE TWO VALUES INDICATED WITH A *, WHICH HAVE AN UNCERTAINTY OF 3 PERCENT.

7) VOI WAS ASSUMED TO BE EQUAL TO VACAVILLE BASALT ENTRY ---1

TABLE I



BASALT, VACAVILLE
99-29-24-1--94-29-24-1--99-94-
13
12
11
10
9
8
7
6
5
4
US
0
1
2
3
4
5
6
7
UP

99-29-24-1--100-29-24-1--24-1
GRANITE (GRANODIORITE, HARDHAT)

ORTHOCLASE	K-AL-SI3-O8		26 WT.PERCENT
PLAGIOCLASE			37 - -
	NA-AL-SI3-O8	90-80	- -
	CA-AL2-SI2-O8	REST	- -
QUARTZ	SI-O2		29 - -
BIOTITE	K-(MG,FE)3-AL-SI3-O10-(O-H)2		6 - -
HORNBLENDE	CA2-NA-(MG,FE)4-(AL,FE,TI)3-SI6-O22-(O,O-H)2		1 - -
ACCESSORY MINERALS			REST
PARTICLE SIZE.			0.2 TO 5.0 MM.

V0 = 0.3738 CC/G
V0I= 0.376 CC/G

TABLE I LISTS SAMPLE THICKNESS IN MM. AND THE SHOCK- AND PARTICLE VELOCITIES OF THE TWO-WAVE SYSTEM, IN KM/SEC. TABLE II LISTS INITIAL DENSITY IN G/CC., PRESSURE IN KBAR AND COMPRESSION.

TABLE I

NO	X	US1	UP1	US2	UP2	UFS
•1A	6.38	5.96	0.28	5.19	0.85	1.65
1B	12.38	5.95	0.27	5.21	0.85	1.60
2A	6.36	5.90	0.29	5.68	1.53	2.92
•2B	12.73	5.96	0.28	5.55	1.54	2.71
•3A	6.88	5.99	0.28	5.37	0.87	
•3B	12.72	5.98	0.28	5.25	0.88	1.64
4A	6.37	6.04	0.28	5.50	1.54	2.92
4B	12.68	5.97	0.27	5.50	1.54	2.87
5A	6.24	6.02	0.34	5.51	1.22	2.38
5B	25.77	5.94	0.20	5.40	1.23	1.99
6B	25.76	6.05	0.29	5.45	1.25	2.00
7	6.37	6.08	0.29	5.44	1.26	2.30
••8	6.18	5.98	0.28	5.71	1.82	3.40
9				7.04	3.00	5.90

US =

TABLE II

NO	RHO0	P1	V1/V0	P2	V2/V0
1A	2.675	45.•	0.9530	123.	0.842
1B	-	43.	0.9514	124.	0.840
2A	-	46.	0.9508	233.	0.732
2B	-	45.•	0.9530	231.	0.725
3A	-	45.•	0.9532	130.	0.843
3B	-	45.•	0.9532	128.	0.838
4A	-	46.	0.9536	230.	0.723
4B	-	42.	0.9548	229.	0.723
5A	2.674	54.	0.9435	183.	0.783
5B	2.675	31.	0.9663	180.	0.775

68	2.67	47.	0.9521	186.	0.775
7	2.700	48.	0.9523	189.	0.773
8	2.701	45.*	0.9532	284.	0.683
9	2.675			565.	0.574

COMMENTS:

1) SOURCE: PETERSEN, C. F., MURRI, W. J. ANDERSON,G. D. AND ALLEN C. F.
S.R.I. INTERIM TECH. REPORT. PROJECT PGU-6618 (1968)
STANFORD RES. INST., MENLO PARK, CALIF., U.S.A.

2) EXPERIMENTAL TECHNIQUE: C1 AND D(WHERE A REFLECTING FOIL IS PLACED A KNOWN DISTANCE FROM THE SAMPLE SURFACE IN GLYCEROL OR ETANOL).
DATA REDUCTION TECHNIQUE: B AND D(FIRST WAVE)

3) EXP. TECHN. D MEASURED PARTICLE VELOCITY AND PRESSURE OF THE PARTIALLY DECOMPRESSED SAMPLE YIELDING THE FOLLOWING RELEASE STATE POINTS

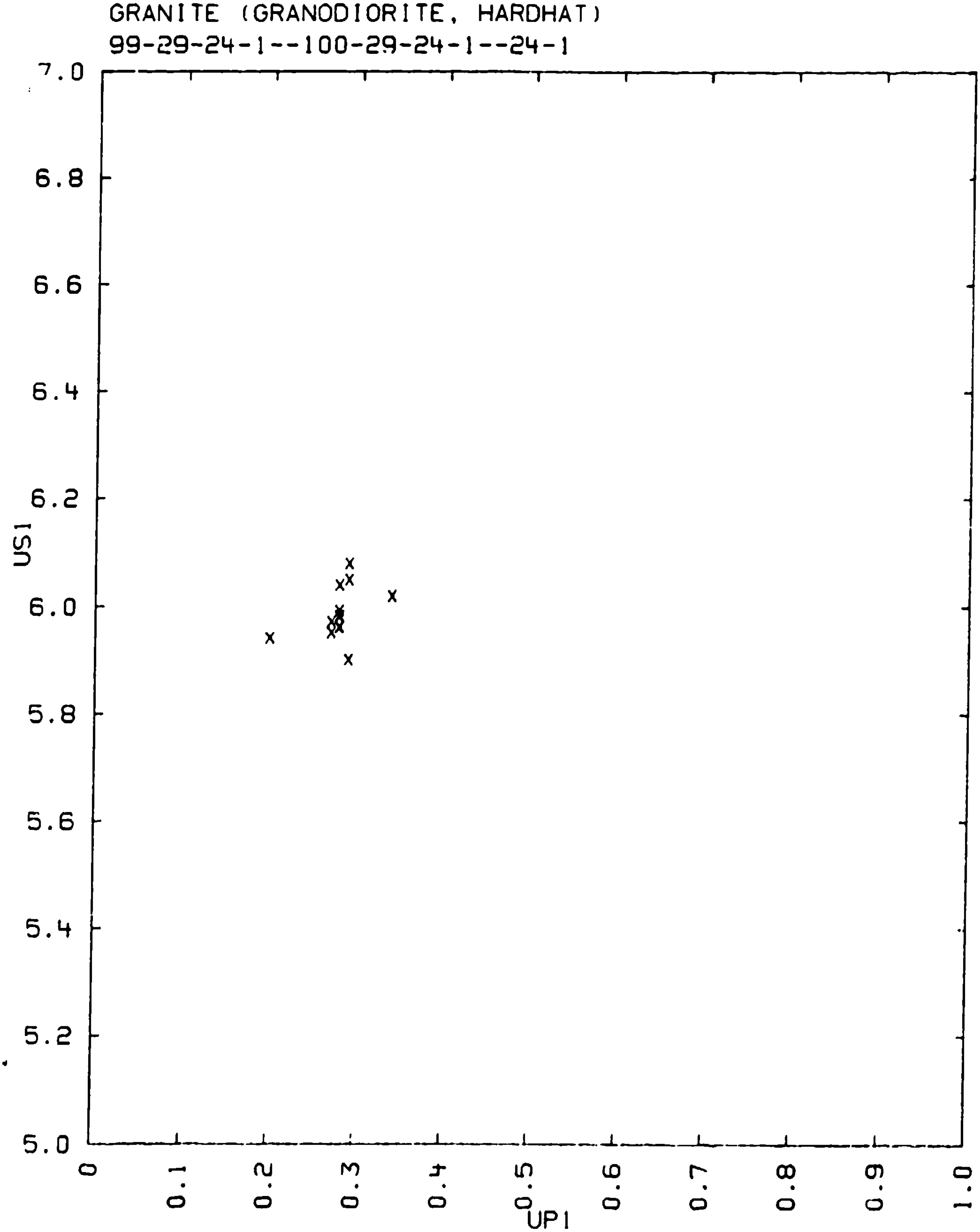
	P	UP	P	UP
HUG.POINT	189.	1.26	284.	1.82
REL.STATE1	111.	1.73	170.	2.28
- - 2	0.	2.30	122.	2.64
- - 3			0.	3.40

4) THE UP1 VALUES FOR THE POINTS MARKED WITH * ARE THE AVERAGE OF THE REMAINING POINTS. THE US1 AND UP1 VALUES FOR THE POINT MARKED ** ARE ALSO THE AVERAGE OF THE REMAINING POINTS.
SINCE THE MEASURED VELOCITIES WERE OF RELATIVELY LOW ACCURACY.
SINCE THE EXPERIMENTAL QUANTITIES MEASURED ARE US AND UP, THE FINAL STATE IS INSENSITIVE TO THE VALUES SELECTED FOR THE FIRST WAVE.

5) THE ABOVE COMPOSITION WAS TAKEN FROM THE LITERATURE
SHORT, M. M. J. GEOPHYS. RES., VOL. 71, P. 1195, (1966)
HOUSER, F. N. AND POOLE, F. G.
U.S. GEOLOGICAL SURVEY, REPT. TEM-836A(1959)

6) VOI IS THE SUM OF THE QUANTITIES (WT. PERCENT)/(100*RHO) FOR ALL THE MINERALS LISTED. RHO IS GIVEN BY DANAS MANUAL OF MINERALOGY REVISED BY C.S. HURLBUT JR. (JOHN WILEY AND SONS INC.,N.Y., 1959).

TABLE I

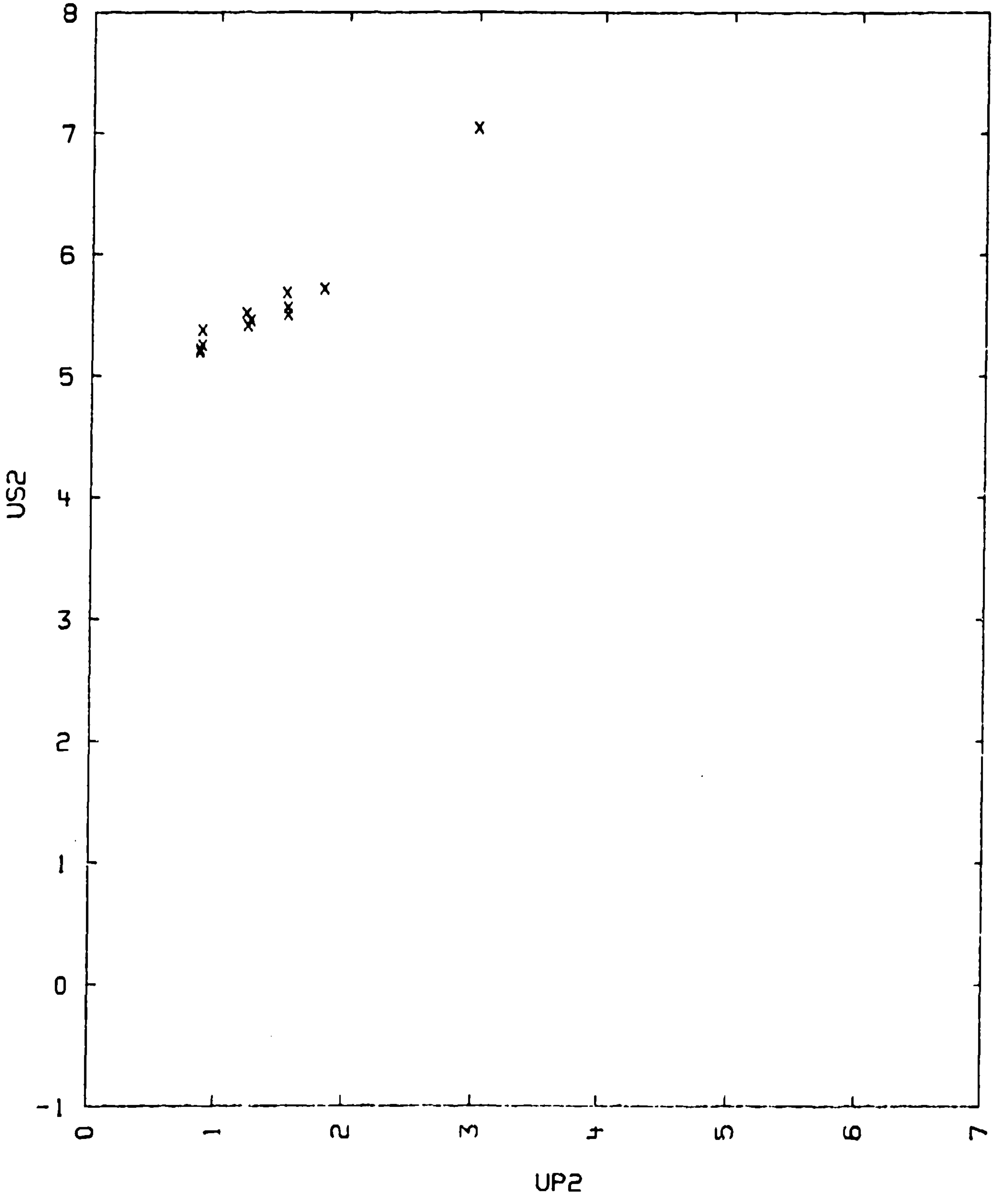


GRANITE (GRANODIORITE, HARDHAT)
99-29-24-1--100-29-24-1--24-1
7.0
6.8
6.6
6.4
6.2
6.0
5.8
5.6
5.4
5.2
5.0
US1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
UP1

TABLE I

GRANITE (GRANODIORITE, HARDHAT)

99-29-24-1--100-29-24-1--24-1



99-94-29-24-1--99-94-93-41-24-1---1
DIABASE, MARYLAND (SILICATE ROCK)

PYROXENE:		49	
AUGITE	(NA,CA)(MG,FE,AL)(SI,AL)2-O6		24
HYPERSTHENE	(FE,MG)SI-O3		25
PLAGIOCLASE:		48	
ANORTHITE	CA-AL2-SI2-O8		32
ALBITE	NA-AL-SI3-O8		16
OLIVENE	(MG,FE)2-SI-O4	1	
MICA		1	

V0 = 0.332 CC/G   CL = 6.82 KM/SEC.

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE SAMPLE HOLDER AND STANDARD MATERIAL.

TABLE

RHO0	US	UP	P	V/V0	US(ST)
3.01	6.00	0.89	161.	0.852	6.55
3.01	6.11	0.96	177.	0.843	6.64
3.01	6.05	1.22	223.	0.798	6.95
3.01	6.05	1.24	225.	0.795	6.97
3.01	5.98	1.28	231.	0.786	7.02
3.01	6.15	1.63	301.	0.735	7.44
3.02	6.22	1.74	326	0.722	7.58
3.01	6.29	1.81	344	0.710	7.67
3.01	6.39	1.91	368	0.702	7.80
3.01	6.89	2.27	472	0.669	8.28
3.01	6.90	2.31	481	0.663	8.33
3.01	7.38	2.65	590	0.640	8.78
3.01	7.39	2.66	593	0.639	8.80
3.02	7.99	3.13	754	0.609	9.42
3.02	8.08	3.14	765	0.613	9.45
3.01	8.36	3.30	832	0.604	9.68
3.02	8.75	3.65	963	0.584	10.13
3.01	9.04	3.78	1029	0.581	10.33

US = 3.778 + 1.371*UP KM/SEC FOR UP FROM 1.9 TO 3.8 KM/SEC.
SIGMA US = 0.050 KM/SEC.

COMMENTS :

1) SOURCE: MCQUEEN R. G. AND MARSH S. P.
PRIVATE COMMUNICATION (1966)
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMIMUM
3) THE MODAL ANALYSIS ON THESE SAMPLES WHICH WERE OBTAINED FROM BIRCH WAS TAKEN FROM F. BIRCH, J. GEOPHYS. RES., NO. 65, P. 1083 (1960)

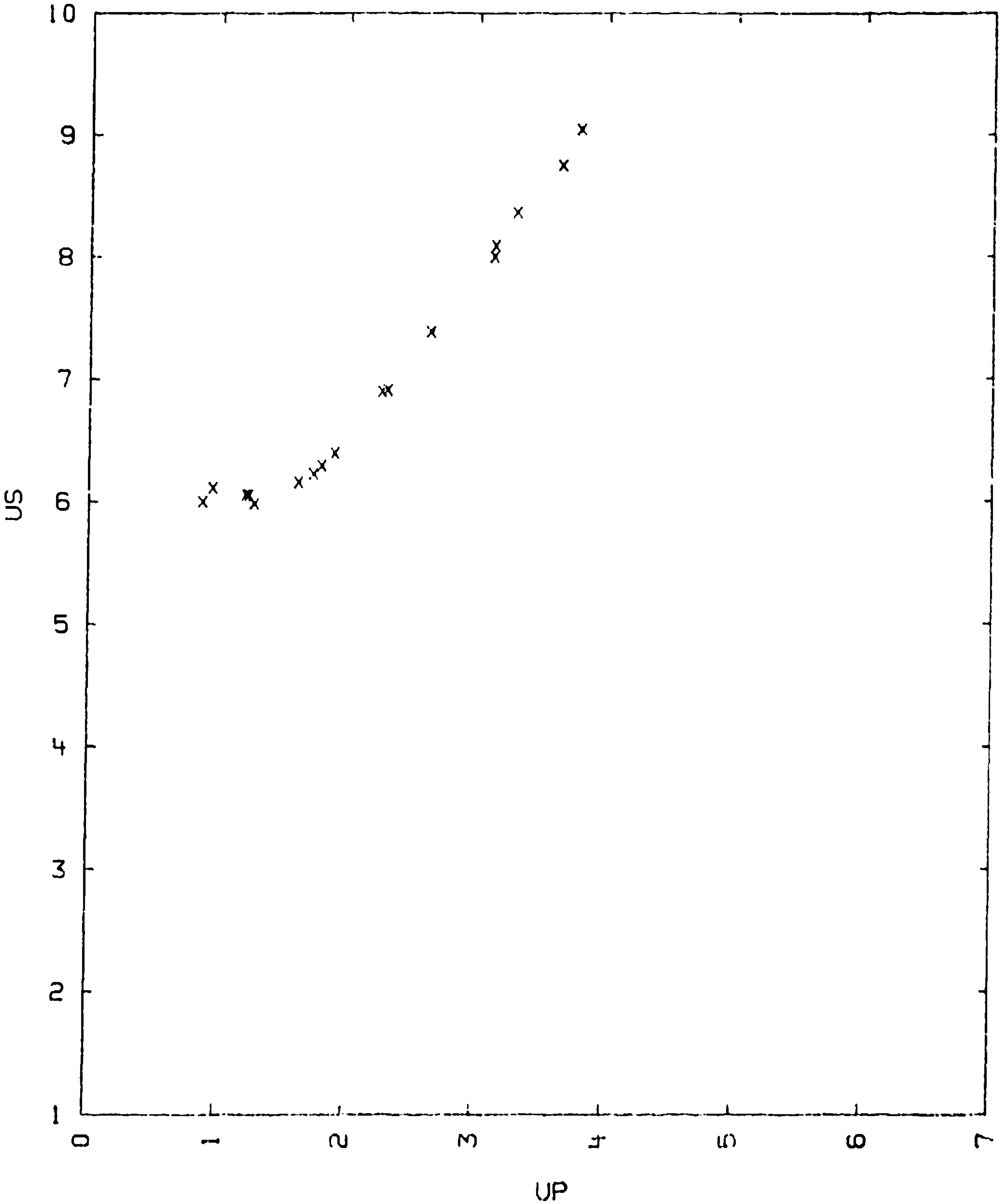
ALSO PRIVATE COMMUNICATION (1966)

4) FURTHER WORK IS IN PROGRESS.

TABLE I

DIABASE, MARYLAND (SILICATE ROCK)

99-94-29-24-1--99-94-93-41-24-



99-94-93-29-24-1--41-29-24-1---1
ECLOGITE, HEALDSBURG, CALIF. (SILICATE ROCK)

GARNET:			24	VOLUME	PERCENT
ALMANDITE	FE3-AL2(SI-04)3	14		-	-
PYROPE	MG3-AL2(SI-04)3	3		-	-
GROSSULARITE	CA3-AL2(SI-04)3	4.5		-	-
ANDRADITE	CA3-FE2(SI-04)3	2.4		-	-
SPESSARTITE	MN3-AL2(SI-04)3	0.5		-	-
OMPHASITE:			72	-	-
DIOPSIDE	CA-MG(SI2-06)	39.7		-	-
JADEITE	NA-AL(SI2-06)	20.4		-	-
ACMITE	NA-FE(SI2-06)	8.6		-	-
REST	UNKNOWN	3.3		-	-
REST			4	-	-

V0 = 0.295 TO 0.288 CC/G   CL = 7.84 KM/SEC
V0I = 0.288 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE SAMPLE HOLDER AND STANDARD MATERIAL.

TABLE

RHO0	US	UP	P	V/V0	US(ST)
3.35	6.52	0.53	115.	0.919	6.16
3.45	7.03	0.76	183.	0.892	6.53
3.38	6.92	0.78	182.	0.887	6.54
3.47	7.30	1.05	265.	0.856	6.96
3.38	7.20	1.08	262.	0.850	6.97
3.45	7.62	1.23	324.	0.839	7.23
3.46	7.72	1.38	368.	0.821	7.44
3.42	7.71	1.44	381.	0.813	7.52
3.42	7.77	1.48	392.	0.810	7.56
3.43	7.84	1.56	418.	0.801	7.68
3.44	7.74	1.57	418.	0.797	7.69
3.43	7.83	1.58	425.	0.798	7.71
3.44	7.88	1.61	438.	0.796	7.76
3.38	8.29	2.09	587.	0.748	8.41
3.43	8.43	2.17	627.	0.743	8.53
3.45	8.56	2.36	697.	0.724	8.79
3.40	8.60	2.37	694.	0.724	8.80
3.40	8.41	2.38	681.	0.717	8.78
3.36	8.56	2.66	764.	0.689	9.12
3.41	8.60	2.76	817	0.677	9.30
3.39	8.79	2.87	858	0.673	9.44
3.40	8.79	2.94	877	0.667	9.51
3.41	9.06	3.07	951	0.661	9.73
3.47	9.41	3.25	1062	0.655	10.03
3.43	9.33	3.37	1078	0.640	10.13

US = 5.86 + 1.36*UP KMSEC. FOR UP FROM 0.5 TO 1.4 KM/SEC.
SIGMA = 0.10 KM/SEC.

US = 6.56 + 0.812*UP KM/SEC. FOR UP FROM 1.4 TO 2.7 KM/SEC.
SIGMA US = 0.09 KM/SEC.

US = 4.808 + 1.375*UP KM/SEC. FOR UP FROM 2.78 TO 3.4 KM/SEC
SIGMA US = 0.096 KM/SEC.

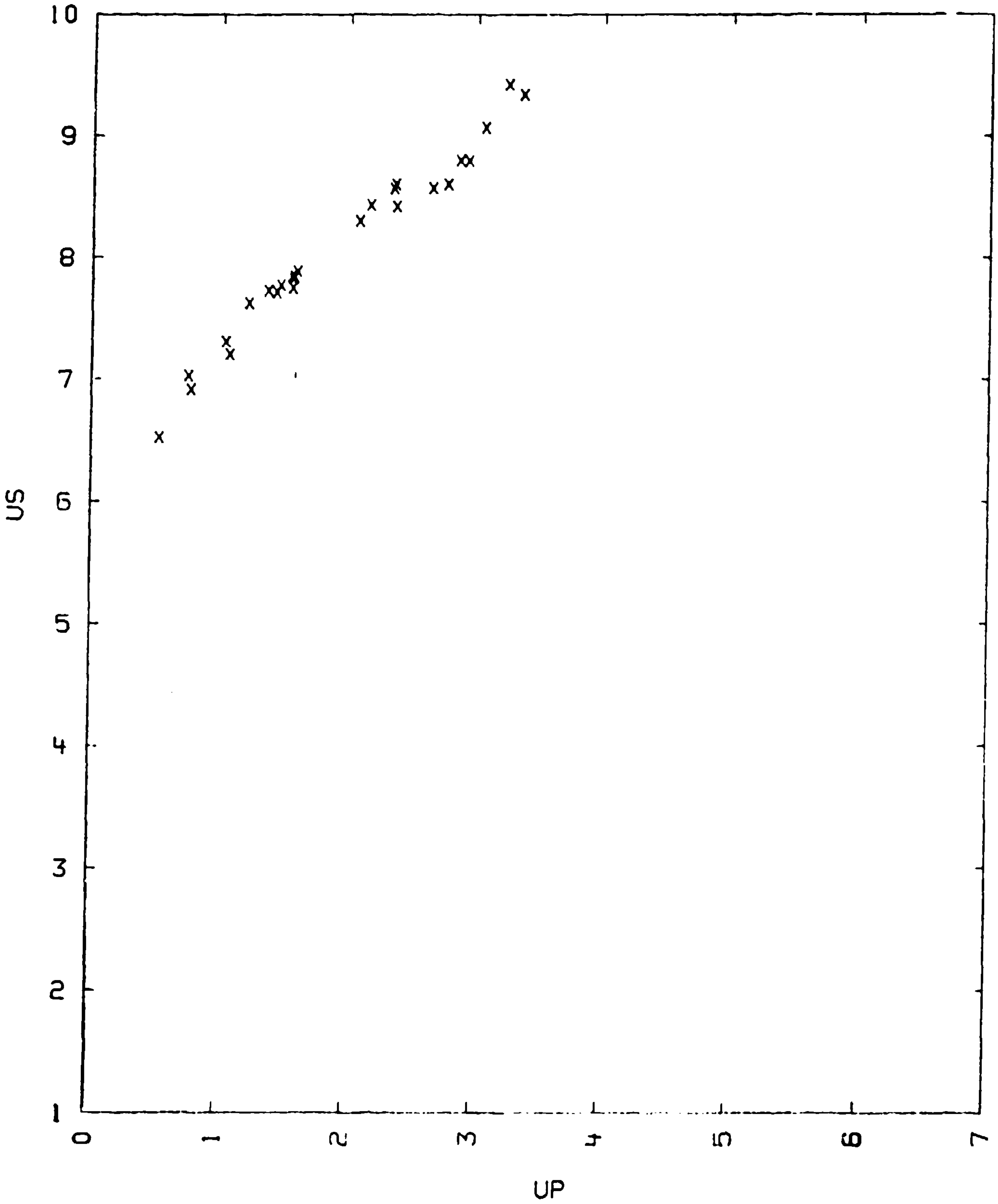
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) THE MODAL ANALYSIS OF THESE SAMPLE WHICH WERE OBTAINED THROUGH BIRCH
WAS TAKEN FROM: BIRCH F., J. GEOPHYS. RES., VOL. 65, P. 1083 (1960)
ALSO PRIVATE COMMUNICATION
SEE ALSO: I. BORG, BULL. GEOL. SOC. AMER., VOL. 67, P. 1563, (1956).
4) FURTHER WORK IN PROGRESS.
5) CL ALSO WAS OBTAINED FROM BIRCHS 1960 PAPER.
6) V0I WAS CALCULATED BY ASSUMING VOLUME ADDITIVITY OF THE COMPONENTS.
DIOPSIDE AND JADEITE DENSITIES WERE FROM: CRYSTAL DATA DETERMINATIVE
TABLES (AM. CRYST. ASSOCIATION, POLYCRYSTAL BOOK SERVICE, BROOKLYN,
N.Y., 1963) 2ND ED. THE OTHER DENSITIES WERE TAKEN FROM: C.S. HURLBUT
DANAS MANUAL OF MINERALOGY. (JOHN WILEY AND SONS, N.Y. 1963) 17 ED.

TABLE I

ECLOGITE, HEALDSBURG, CALIF. (SILICATE ROCK)

99-94-93-29-24-1--41-29-24-1--



99-94-93-29-24-1--41-29-24-1--93-29-24-1---1
ECLOGITE, NORWAY (SILICATE ROCK)

OMPHASITE	(AL-NA,MG-CA)SI2-06	52		VOL.	PERCENT
GARNET:		42		-	-
ALMANDITE	FE3-AL2(SI-04)3		25	-	-
PYROPE	MG3-AL2(SI-04)3		17	-	-
BIOTITE	K(MG,FE)3(AL-SI3-010)(0-H)2	6		-	-

V0 = 0.287 TO 0.279 CC/G   CL = 7.4 KM/SEC

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE SAMPLE HOLDER AND STANDARD MATERIAL.

TABLE

RHOO	US	UP	P	V/V0	US(ST)
3.59	6.80	0.50	121.	0.926	6.16
3.53	7.02	0.75	187.	0.893	6.54
3.56	7.10	0.77	195.	0.892	6.57
3.57	7.40	1.02	270.	0.862	6.95
3.60	7.39	1.03	273.	0.861	6.97
3.51	7.31	1.07	274.	0.854	6.99
3.53	7.63	1.22	328.	0.840	7.23
3.55	7.86	1.35	376.	0.828	7.44
3.56	8.04	1.51	432.	0.812	7.68
3.58	7.92	1.51	428.	0.809	7.67
3.48	7.84	1.61	439	0.795	7.76
3.52	7.99	1.61	453	0.798	7.80
3.51	7.83	1.63	448	0.792	7.79
3.59	8.37	2.03	609	0.757	8.41
3.58	8.81	2.27	718	0.741	8.78
3.54	8.72	2.31	713	0.734	8.79
3.56	8.88	2.55	805	0.712	9.12
3.57	9.11	2.72	886	0.701	9.38
3.53	9.24	2.76	902	0.700	9.44
3.52	9.36	2.99	984	0.681	9.73
3.56	9.22	2.99	983	0.676	9.73
3.55	9.72	3.26	1125	0.664	10.13

US = 6.15 + 1.21*UP KM/SEC. FOR UP FROM 0.5 TO 1.4 KM/SEC.
SIGMA US = 0.07 KM/SEC.

US = 6.40 + 0.997*UP KM/SEC. FOR UP FROM 1.5 TO 3.3 KM/SEC.
SIGMA US = 0.11 KM/SEC.

COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B

DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM.

3) THE MODAL ANALYSIS OF THESE SAMPLES WHICH WERE OBTAINED THROUGH BIRCH WAS TAKEN FROM F. BIRCH, J. GEOPHYS. RES., VOL. 65, P. 1083 (1960)

4) FURTHER WORK IS IN PROGRESS

5) THE GARNET COMPOSITION LISTED BY BIRCH IS:

SI-02,	AL2-03,	FE-0,	TI-02,	FE2-03,	MN-0,	MG-0,	CA-0,	H2-0	
36.30	20.18	32.01	2.45	0.07	1.74	4.75	2.02	0.27	WT PERCENT

6) NO DETAILED ANALYSIS OF THE OMPHACITE EXISTS. ANOTHER SAMPLE FROM THIS GENERAL LOCALITY IN ESCOLA HAS THE COMPOSITION:

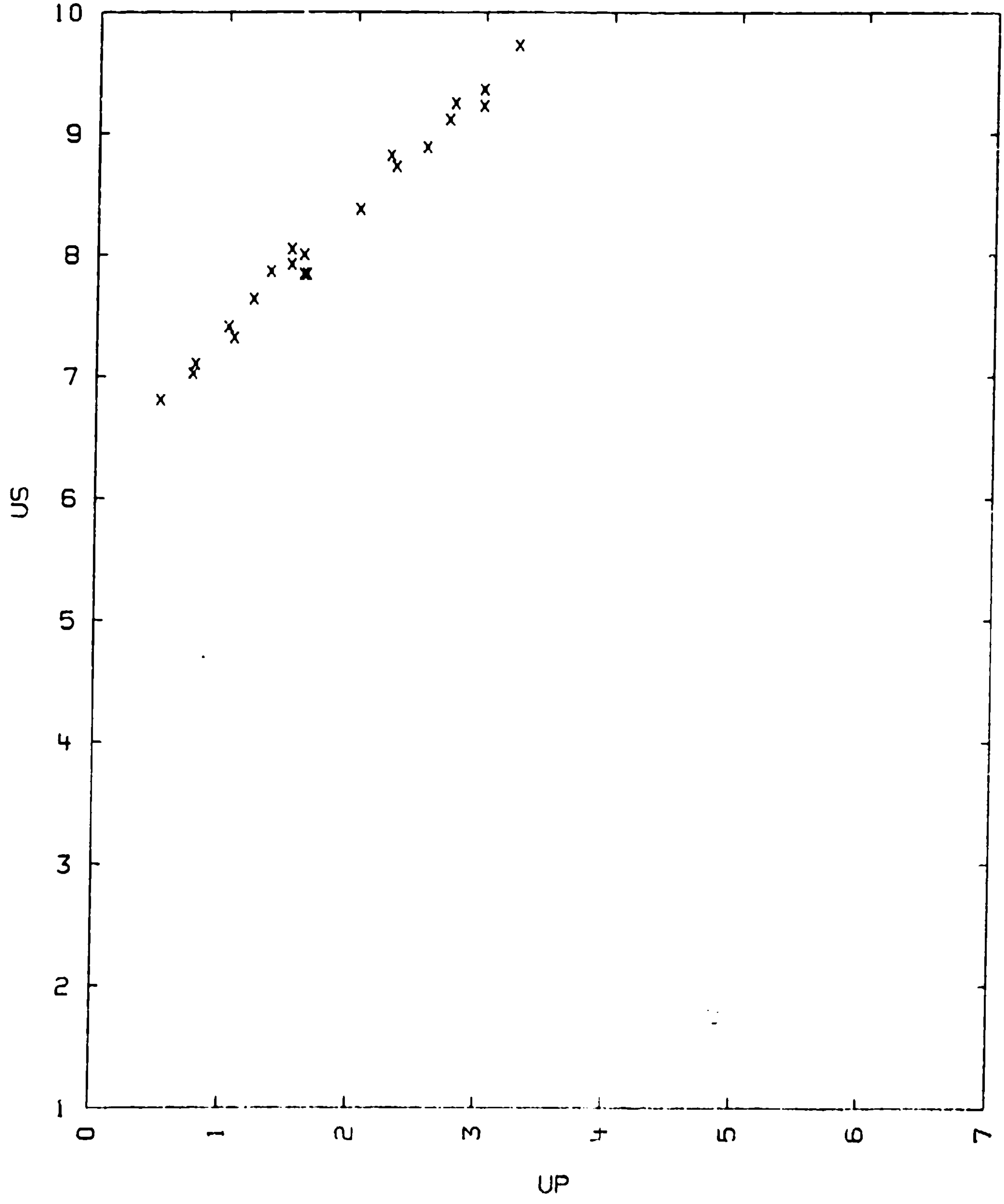
DIOPSIDE	83.48
JADEITE	7.38
ENSTATITE	4.67
TSCHERMAKS SILICATE	4.12
UNACCOUNTED FOR	0.73

F. BIRCH, PRIVATE COMMUNICATION (1967)

TABLE I

ECLOGITE, NORWAY (SILICATE ROCK)

99-94-93-29-24-1--41-29-24-1--



100-29-24-1--99-29-24-1--24-1---1
GRANITE, WESTERLY, R. I. (SILICATE ROCK)

MICROCLINE	K-AL-SI3-O8	35.4	VOLUME PERCENT
ALBITE	NA-AL-SI3-O8	25.1	- -
ANORTHITE	CA-AL-SI3-O8	6.3	- -
QUARTZ	SI-O2	27.5	-
MICA		3.2	- -

V0 = 0.3817 CC/G   CL = 6.1 KM/SEC
V0I= 0.3811 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE SAMPLE HOLDER AND STANDARD MATERIAL.

TABLE

RHO0	US	UP	P	V/V0	US(ST)
2.63	5.29	1.00	138.	0.811	6.55
2.63	5.31	1.01	141.	0.810	6.57
2.63	5.45	1.35	193.	0.752	6.95
2.63	5.46	1.37	196.	0.749	6.97
2.63	5.42	1.39	198.	0.744	6.99
2.63	5.45	1.43	205.	0.738	7.04
2.63	5.60	1.91	281.	0.659	7.58
2.63	5.61	1.93	285.	0.656	7.60
2.63	5.67	1.99	297.	0.649	7.67
2.62	5.78	2.10	318.	0.637	7.80
2.62	5.69	2.11	315.	0.629	7.79
2.63	6.19	2.50	406	0.596	8.28
2.63	6.18	2.55	414	0.588	8.33
2.63	6.83	2.88	517	0.578	8.78
2.63	7.58	3.37	671	0.557	9.42
2.63	7.99	3.54	744	0.557	9.68
2.63	8.49	3.89	868	0.542	10.13
2.63	8.41	3.90	861	0.537	10.12
2.63	8.62	4.05	919	0.530	10.33

US = 4.93 + 0.372*UP KM/SEC. FOR UP BETWEEN 1.0 AND 2.1
SIGMA US = 0.03 KM/SEC.

US = 2.103 + 1.629*UP KM/SEC FOR UP BETWEEN 2.5 AND 4.1
SIGMA US = 0.074 KM/SEC.

COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) V0I WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED IN CRYSTAL DATA

DETERMINATIVE TABLES (AMERICAN CRYST. ASSN. 1963) 2ND ED.), AND A MICA DENSITY OF 2.80 G/CC

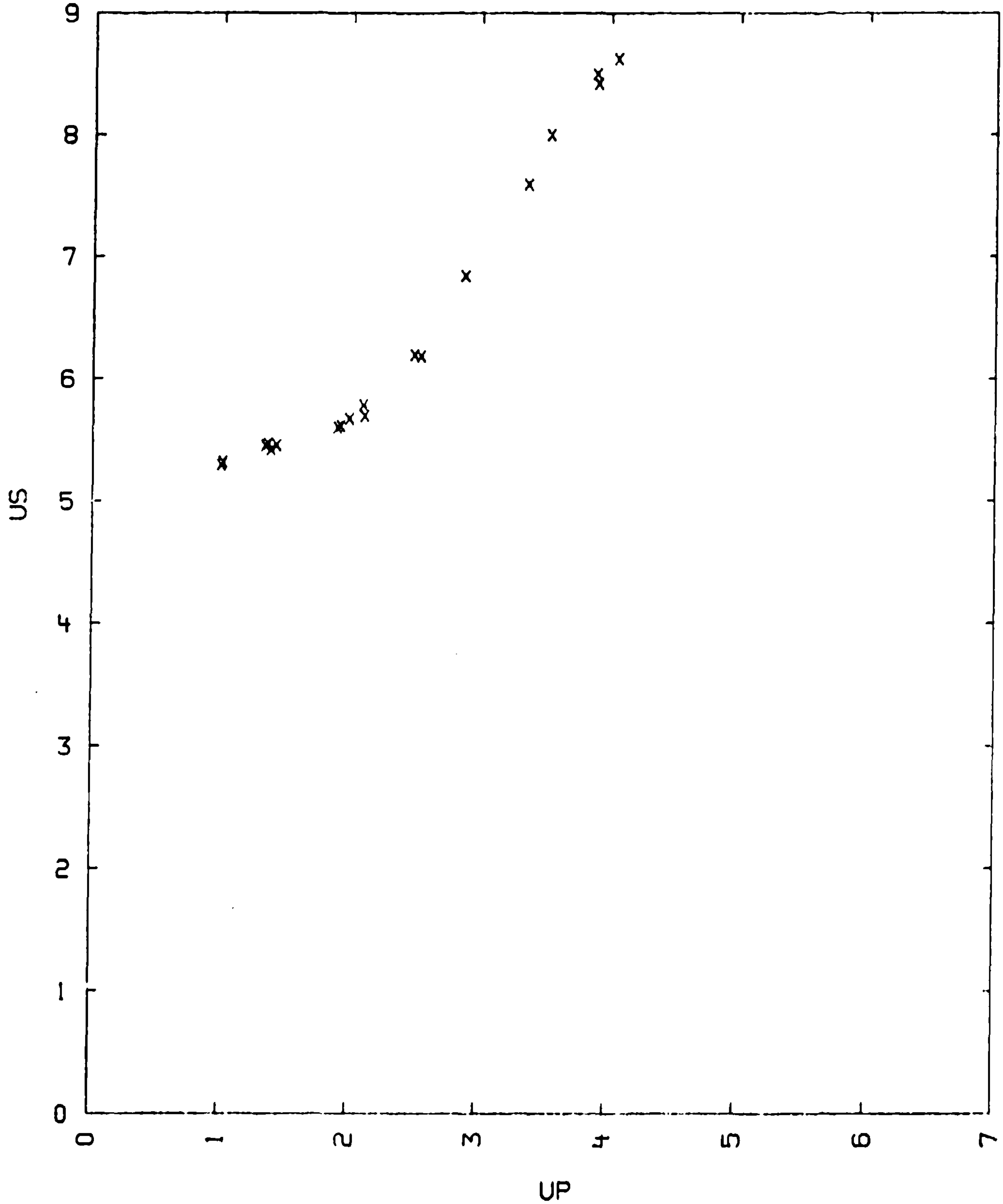
4) THE MODAL ANALYSIS OF THESE SAMPLES WHICH WERE OBTAINED THROUGH BIRCH WAS TAKEN FROM: F. BIRCH, J. GEOPHYS. RES., VOL. 65, P. 1083 (1960) VO IS THE SPECIFIC VOLUME REPORTED BY BIRCH.

5) FURTHER WORK IS IN PROGRESS.

TABLE I

GRANITE, WESTERLY, R. I. (SILICATE ROCK)

100-29-24-1--99-29-24-1--24-1-



100-29-24-1--99-29-24-1--94-29-24-1---1
GRANITE

ORTHOCLASE	K-AL-SI3-O8	47.0 PERCENT BY WT.
PLAGIOCLASE	(AN)X-(AB)Y	26.5 PERCENT
QUARTZ	SI-O2	19.5 PERCENT
MICA		5.0 PERCENT
HORNBLENDE CA2-NA-(MG,FE)4-(AL,FE,TI)3-SI6-O22-(O,OH)2		1.5 PERCENT
OPAQUES		LESS THAN 1.0 PERCENT
POROSITY(MEASURED)		0.8 PERCENT
PARTICLE SIZE		UP TO 5.0 MM

V0 = 0.374 CC/G   CL = 5.64 KM/SEC
CS = 3.53 KM/SEC

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHO0	US	UFS	UP	P	V/V0
2.669	5.38	2.04	0.99	142	0.816
2.669	5.66	3.09	1.63	246	0.712
2.660	5.19		0.49	68	0.906
2.680	7.58	6.38	3.35	680	0.558
2.690	5.52	1.99	0.96	143	0.826
2.686	6.32	4.87	2.57	436	0.593
2.674	5.59	3.33	1.72	257	0.693
2.674	8.27	7.98	3.87	856	0.532
2.679	5.66	1.13	0.49	74	0.914
2.680	5.59	1.73	0.82	123	0.853
2.690	5.65	3.05	1.63	247	0.712
2.675	5.68	3.74	2.11	319	0.629
2.672	6.92	5.59	2.88	533	0.584
2.612	5.37	2.60	1.31	184	0.756
2.614	5.83	4.25	2.22	337	0.619
2.618	5.37	2.06	1.00	140	0.814
2.614	5.38		0.49	68	0.909

US = 2.52 + 1.50 UP KM/SEC   ABOVE UP = 2. KM/SEC.
SIG.US = 0.06

COMMENTS:

1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
S DIVISION REPORT STN 71, AUG 1964
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
(STANDARD MATERIAL 2024 ALUMINUM)
3) THE TABLE LISTS THE RESULTS OF FOUR TYPES OF GRANITE OBTAINED FROM

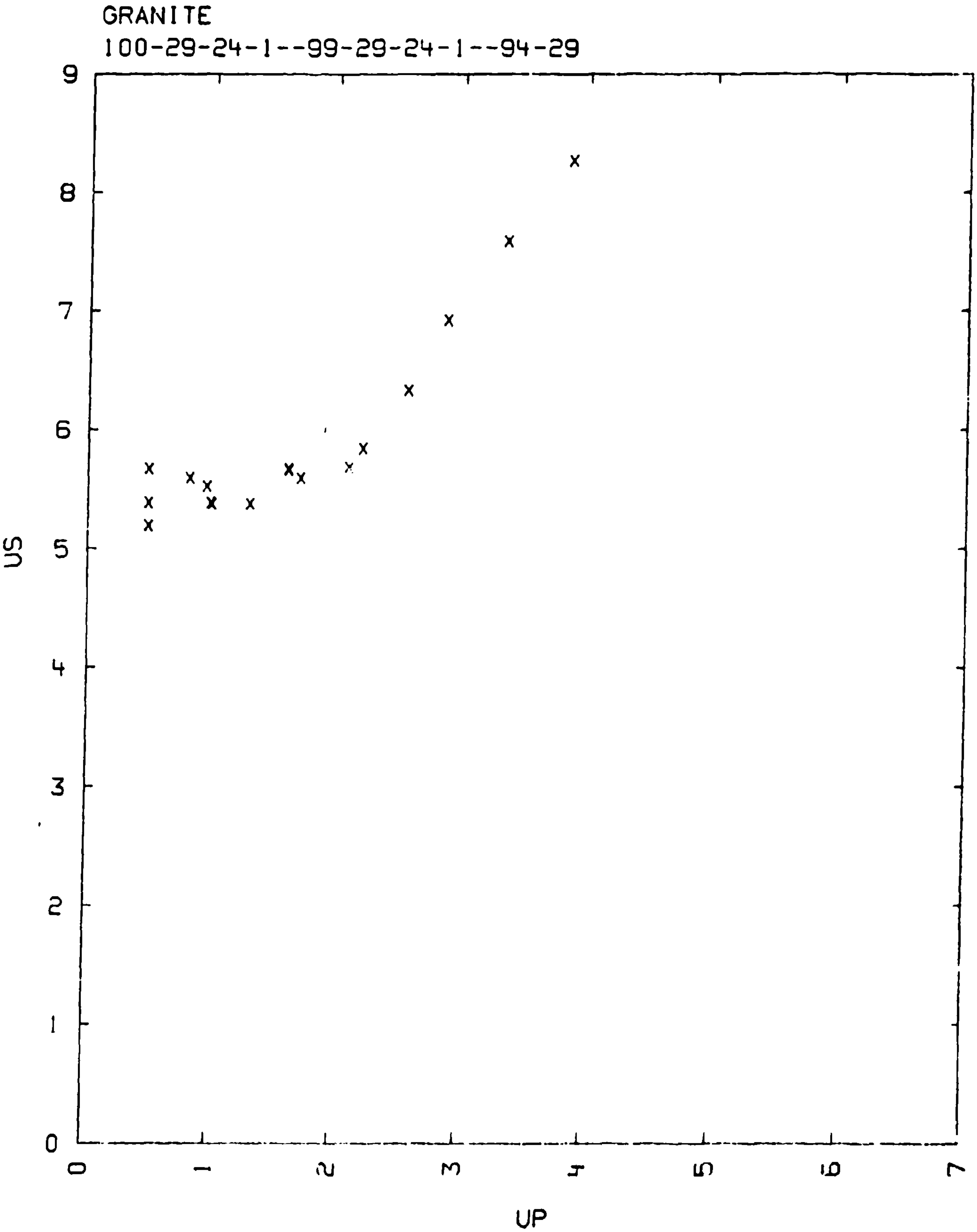
AREA 15 AT THE NATIONAL TEST SITE IN NEVADA.
THE FIRST FOUR POINTS CORRESPOND TO SAMPLES FROM 1005 FEET EXPLORATORY CORE.
THE TWO FOLLOWING POINTS CORRESPOND TO SAMPLES FROM HARDHAT TUNNEL.
THE LAST FOUR POINTS CORRESPOND TO SAMPLES THAT CAN BE VISUALLY CHARACTERIZED AS PINK GRANITE.

4) ALL OF THESE SAMPLES HAVE THE SAME SHOCK VS. PARTICLE VELOCITY DEPENDENCE WITHIN EXPERIMENTAL ERROR.
5) CHEMICAL ANALYSIS (GREY GRANITE AREA 15 NTS NEVADA)

SILICA	71.94 PERCENT BY WT.
FERRIC OXIDE	4.25 PERCENT
ALUMINUM OXIDE	13.68 PERCENT
CALCIUM OXIDE	2.96 PERCENT
MAGNESIUM OXIDE	0.63 PERCENT
SODIUM OXIDE	2.94 PERCENT
POTASSIUM OXIDE	1.44 PERCENT
TITANIUM DIOXIDE	0.26 PERCENT
WATER	1.38 PERCENT

6) MINERALOGICAL AND CHEMICAL ANALYSIS AGREE TO 2 PERCENT.
7) THE CHEMICAL ANALYSIS INDICATES THAT THE PLAGIOCLASE CONSISTS MOSTLY OF ALBITE.

TABLE I



UNCL

BOX V72 PLTR

10:26:28 06/15/77U

XEROX+FILM

EDIT TEST

BOX V72 PLTR

TV80LIB DD80 OUTPUT........... 09:55:29U 06/15

EDIT TEST

BOX V72 PLTR

TV80LIB DD80 OUTPUT............ 09:55:29U 06/15

EDIT TEST

BOX V72 PLTR

TV80LIB DD80 OUTPUT........... 09:55:29U 06/15

237 FRAMES PLOTTED

UNCL

BOX V72 PLTR

10:27:38 06/15/77U

XEROX+FILM

S E C T I O N E

MIXTURES AND SOLUTIONS

WITHOUT

CHEMICAL CHARACTERIZATION

94-93-41-29-24-1 ?
AUGITE

CA-(MG-FE-AL)-(AL-SI)2-06
GRAIN SIZE ABOUT 0.5 MM.

V0 = 0.2877-0.2971 CC/G CL= 8.18-8.26 KM/SEC
V01= 0.2944-0.2966 CC/G

THE TABLE LISTS DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KBAR. STM IS THE STANDARD BASE PLATE MATERIAL, AL=ALUMINUM AND BR=BRASS D=SAMPLE THICKNESS IN MM.

TABLE I

SAMPLE											STANDARD	
RHO0	US1	UP1	P1	V1/V0	US2	UP2	UFS	P2	V2/V0	D	STM	UFS
3.463	6.61	0.264	60.4	0.960	5.91	0.710	1.22	151.3	0.884	9	AL	1.55
3.475	7.67	0.13	34.6	0.983	6.25	0.670	1.34	151.5	0.896	9	AL	1.51
3.473	7.70	0.177	47.3	0.977	6.74	0.825		198.5	0.881	9	AL	1.89
3.475	7.27	0.13	32.8	0.982	6.68	0.945	1.91	221.7	0.860	6	AL	2.11
3.366	7.84	0.268	70.7	0.966	7.42	1.66	3.29	417.7	0.778	5	AL	3.58
3.393	-	0.13	34.6	0.983	7.79	1.89	3.56	499.7	0.757	6	BR	3.03

US =

TABLE II

SAMPLE							STANDARD	
RHO0	US	UP	UFS	P	V/V0	D	STM	UFS
3.393	7.07	0.935	1.91	224.	.868	6.41	AL	2.11
3.470	7.26	1.26	2.41	317.	.826	8.67	AL	2.82
3.475	7.49	1.42	2.93	369.	.810	5.87	AL	3.18
3.475	7.88	1.87	3.67	512.	.763	6.40	BR	3.03
3.463	7.60	2.05	4.20	540.	.730	4.81	AL	4.41
3.463	7.73	2.10	4.40	562.	.728	4.83	BR	3.34
3.393	7.92	2.16	4.14	580.	.727	6.50	BR	3.45
3.475	7.94	2.15	4.41	593.	.729	6.06	BR	-
3.463	7.65	2.22	4.66	586.	.710	4.83	AL	4.78
3.393	7.92	2.48	4.99	666.	.687	6.84	BR	3.90
3.393	8.31	2.44	4.85	688.	.706	4.97	BR	-
3.463	8.01	2.84	6.03	788.	.645	4.83	BR	4.45

US =

COMMENTS:

1) SOURCE: AHRENS T.J., ROSENBERG J.T., RUDERMAN M.H.
STANFORD RESEARCH INSTITUTE REPORT NO DASA 1868 (1966)
STANFORD RESEARCH INSTITUTE, MENLO PARK, CALIFORNIA 94550
U.S.A.

2) EXPERIMENTAL TECHNIQUE C1 (INCLINED MIRROR)
DATA REDUCTION METHOD B AND D1 (ELASTIC WAVES)

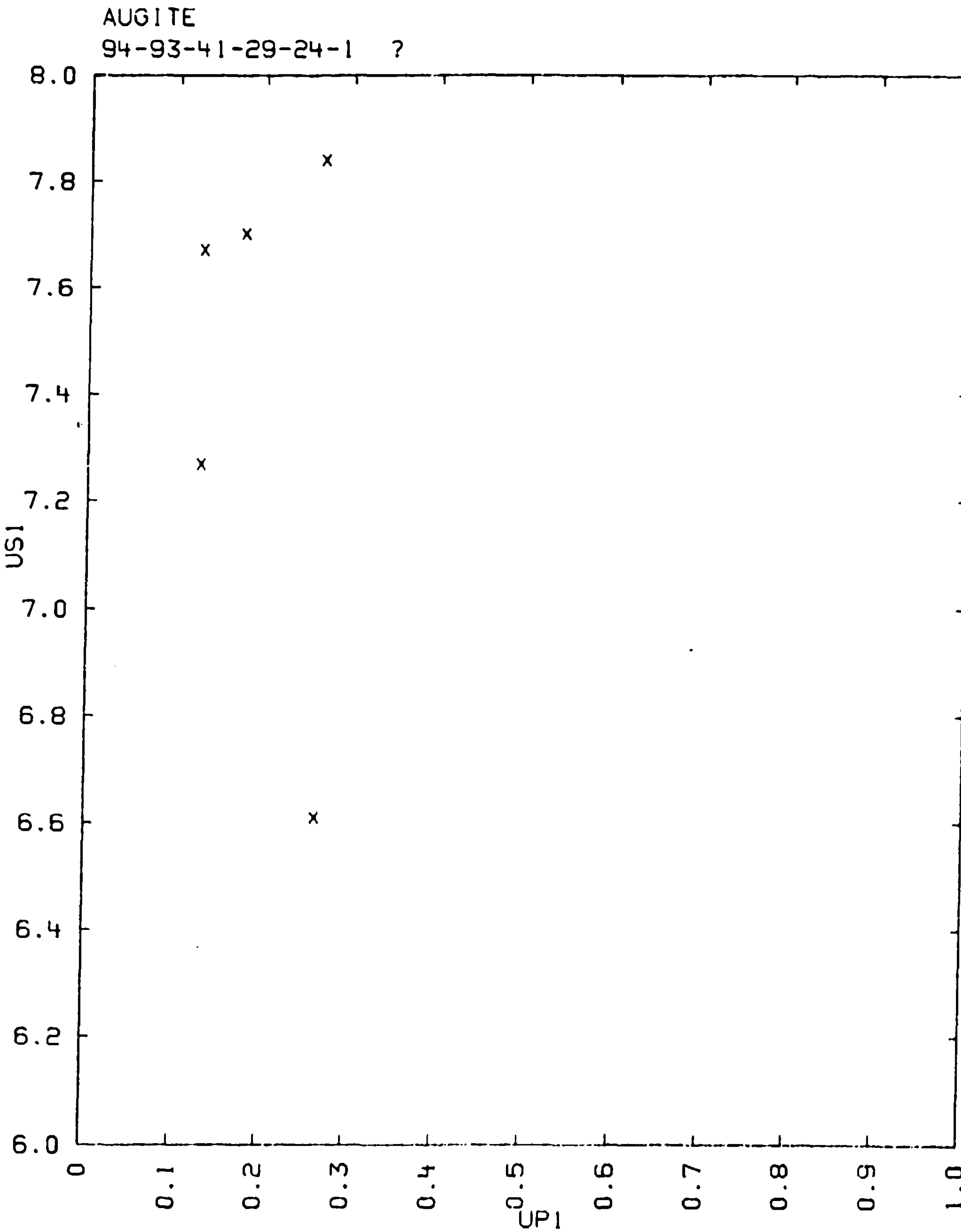
3) V01 IS CALCULATED FROM THE LATTICE CONSTANTS OF A NUMBER OF SAMPLES FROM KANGERDLUGSSAUG FJORD, E GREENLAND :

COMPOSITION: FE 0.212 - 0.362	NA 0.024 - 0.036	MOLES/6 MOLES OF O
AL 0.149 - 0.239	CR 0.0 - 0.022	- - - - -
CA 0.830 - 0.775	TI 0.021 - 0.039	- - - - -
MG 0.830 - 0.695	SI 1.819 - 1.893	- - - - -

DEER AND ABBOTT, MINERAL MAG. 34 177 (1965)

4) THE VALUE OF V01 AND THE ABOVE COMPOSITION SUGGEST THAT THE SAMPLES IN USED FOR THE HUGONIOT MEASUREMENTS WERE RICHER IN FE AND PERHAPS IN AL TOO.

TABLE I



AUGITE
94-93-41-29-24-1 ?
8.0
7.8
7.6
7.4
7.2
7.0
6.8
6.6
6.4
6.2
6.0
USI
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
UPI

TABLE II

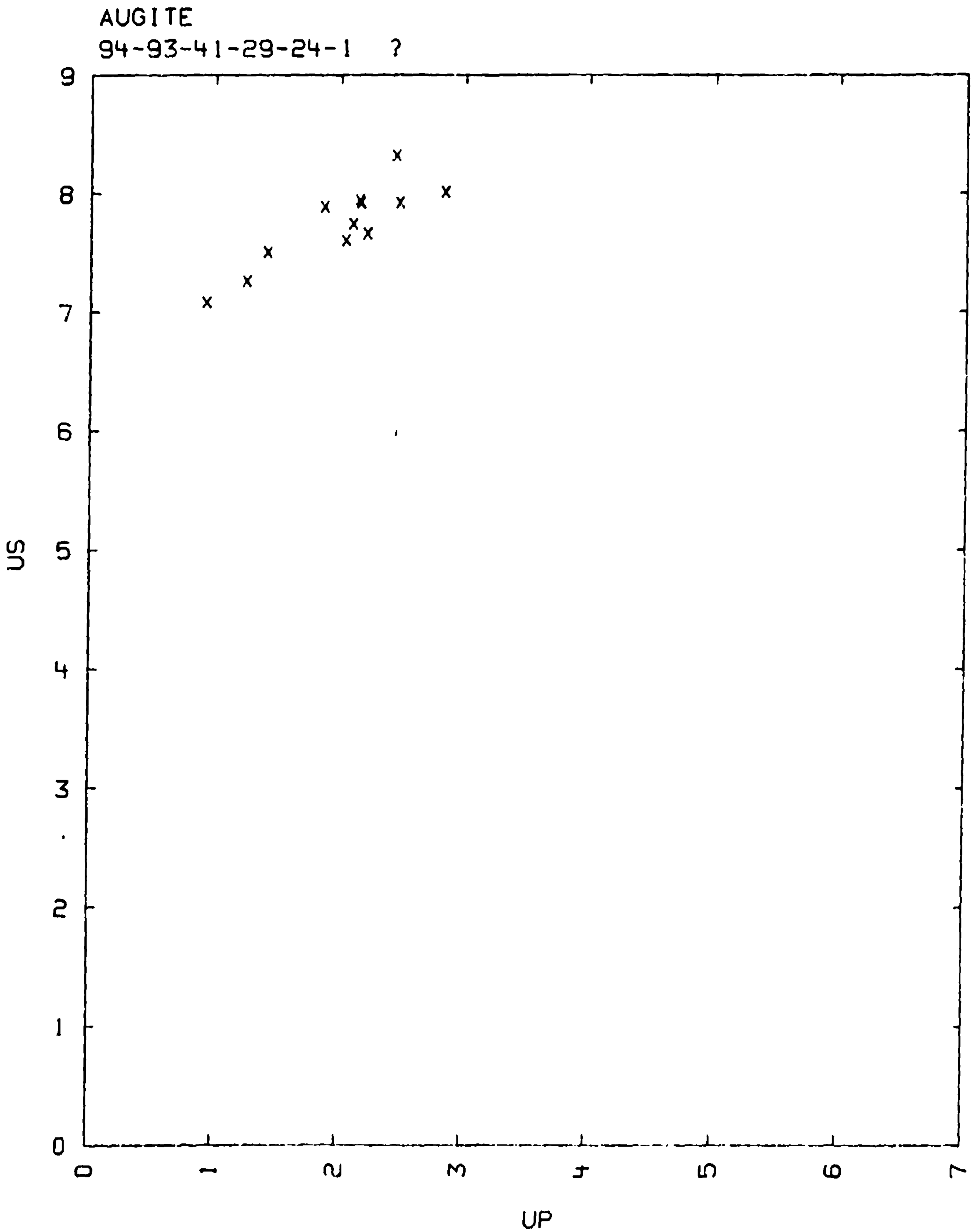
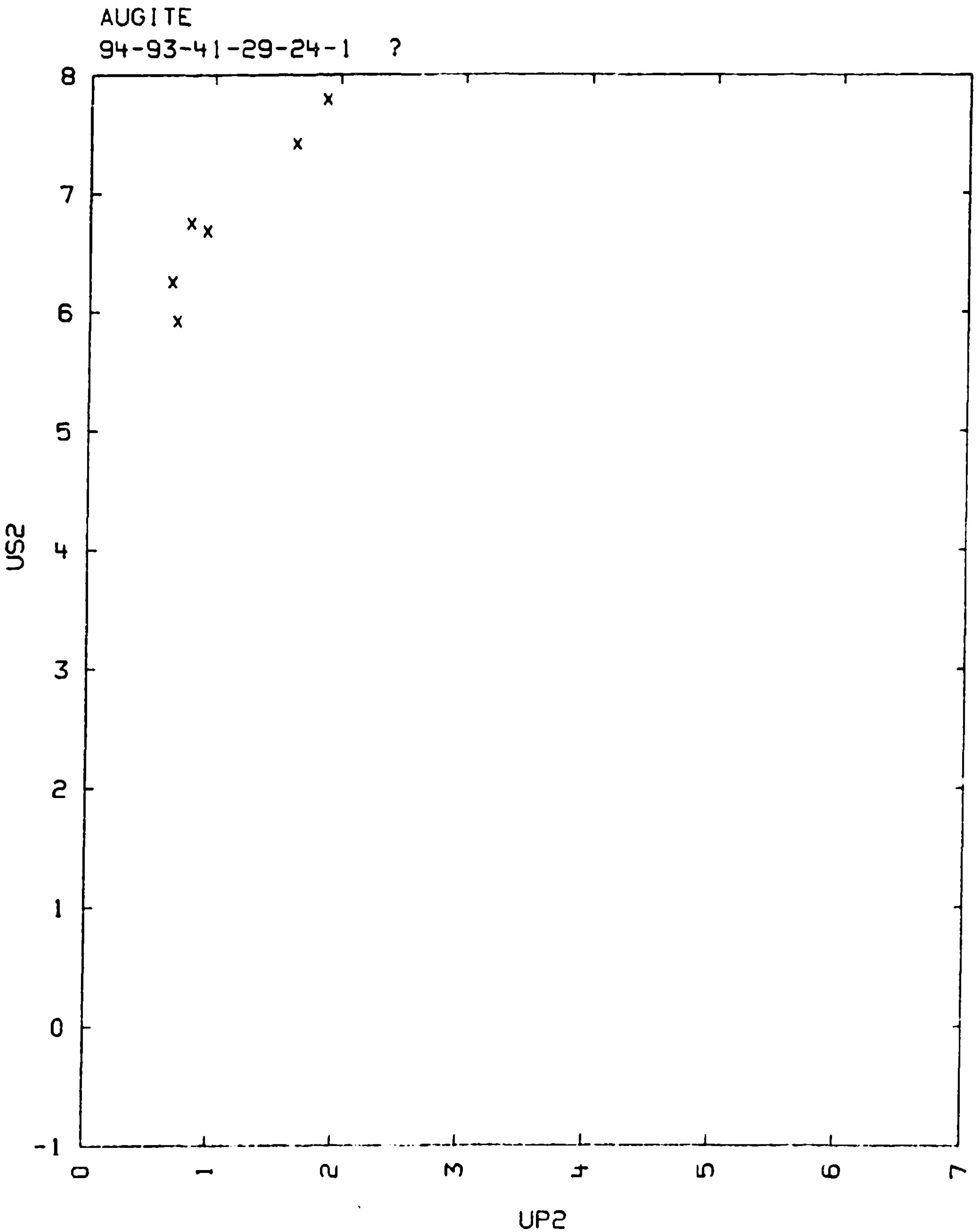


TABLE I



23--29-19-1 ?
CARBON CLOTH LAMINATE WITH ALUMINUM PHOSPHATE RESIN

CARBON CLOTH	C (99.9 PERCENT PURE)	WT PERCENT
RESIN	AL-P-04	- -

V0 = 0.697 AND 0.96 CC/G.

THE TABLE LISTS DENSITY IN G/CC., VELOCITIES IN KM/SEC. AND PRESSURE IN KBAR

TABLE

RHO0	US	UP	P	V/V0	MET
1.435	2.91	0.93	39.	0.68	A
1.435	4.01	1.75	100.	0.56	-
1.435	4.68	2.29	154.	0.51	-
1.435	5.01	2.68	192.	0.47	-
1.435	2.82	0.86	35.	0.70	F
1.435	4.06	1.71	100.	0.58	-
1.435	4.72	2.22	150.	0.53	-
1.435	5.05	2.50	181.	0.50	-
1.435	5.00	2.58	185.	0.48	-
1.04	2.47	0.89	23.	0.64	A
1.04	2.34	0.92	22.	0.61	-
1.04	2.83	1.09	33.	0.61	-
1.04	2.65	1.27	36.	0.52	-
1.04	3.19	1.64	55.	0.48	-
1.04	3.54	1.88	69.	0.47	-
1.04	3.48	1.91	69.	0.45	-
1.04	3.46	2.05	73.	0.41	-
1.04	4.29	2.65	118.	0.38	-
1.04	4.65	2.82	131.	0.39	-

US = 1.412 + 1.097*UP KM/SEC. FOR RHO0 = 1.04
US = 1.778 + 1.270*UP KM/SEC. FOR RHO0 = 1.435

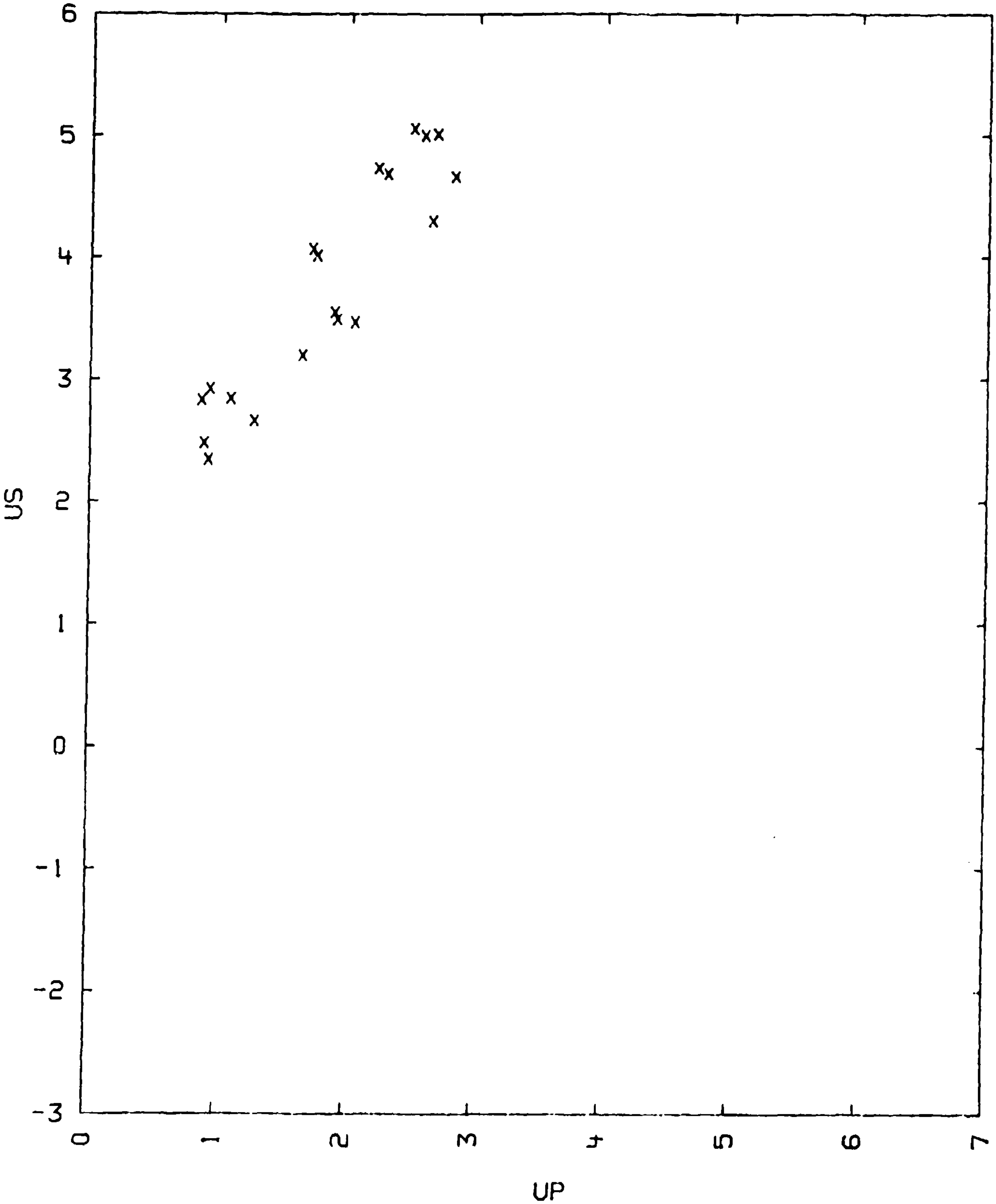
COMMENTS:

1) SOURCE: MAY, R. P. AND KINSEY, C. H.
SANDIA CORPORATION REPORT, SC-DR-67-2958, MARCH 1968
SANDIA CORPORATION, ALBUQUERQUE, NEW-MEXICO, U.S.A.
2) EXPERIMENTAL TECHNIQUE A AND F
DATA REDUCTION METHOD B
3) THE SHOCK DIRECTION WAS PERPENDICULAR TO THE LAMINATIONS.
NO TWO WAVE STRUCTURE WAS OBSERVED.

TABLE I

CARBON CLOTH LAMINATE WITH ALUMINUM PHOSPHATE RESI

23--29-19-1 ?



23-2 ?
CARBON PHENOLIC, FILAMENT WOUND AND PYROLISED

VO = 0.769 CC/G.   CL = 2.60 KM/SEC

THE TABLE LISTS DENSITY IN G/CC.,VELOCITY IN KM/SEC. AND PRESSURE IN KBAR

TABLE

RHOO	US	UP	P	V/VO
1.30	2.93	0.75	29.	0.74
1.30	3.90	1.21	61.	0.69
1.30	4.28	1.59	88.	0.63
1.345	4.20	1.62	92.	0.61
1.30	4.56	1.61	96.	0.65
1.30	5.10	2.36	156.	0.54
1.30	5.42	2.69	190.	0.52

US = 1.344 + 2.44*UP - 0.351*UP**2. KM/SEC.

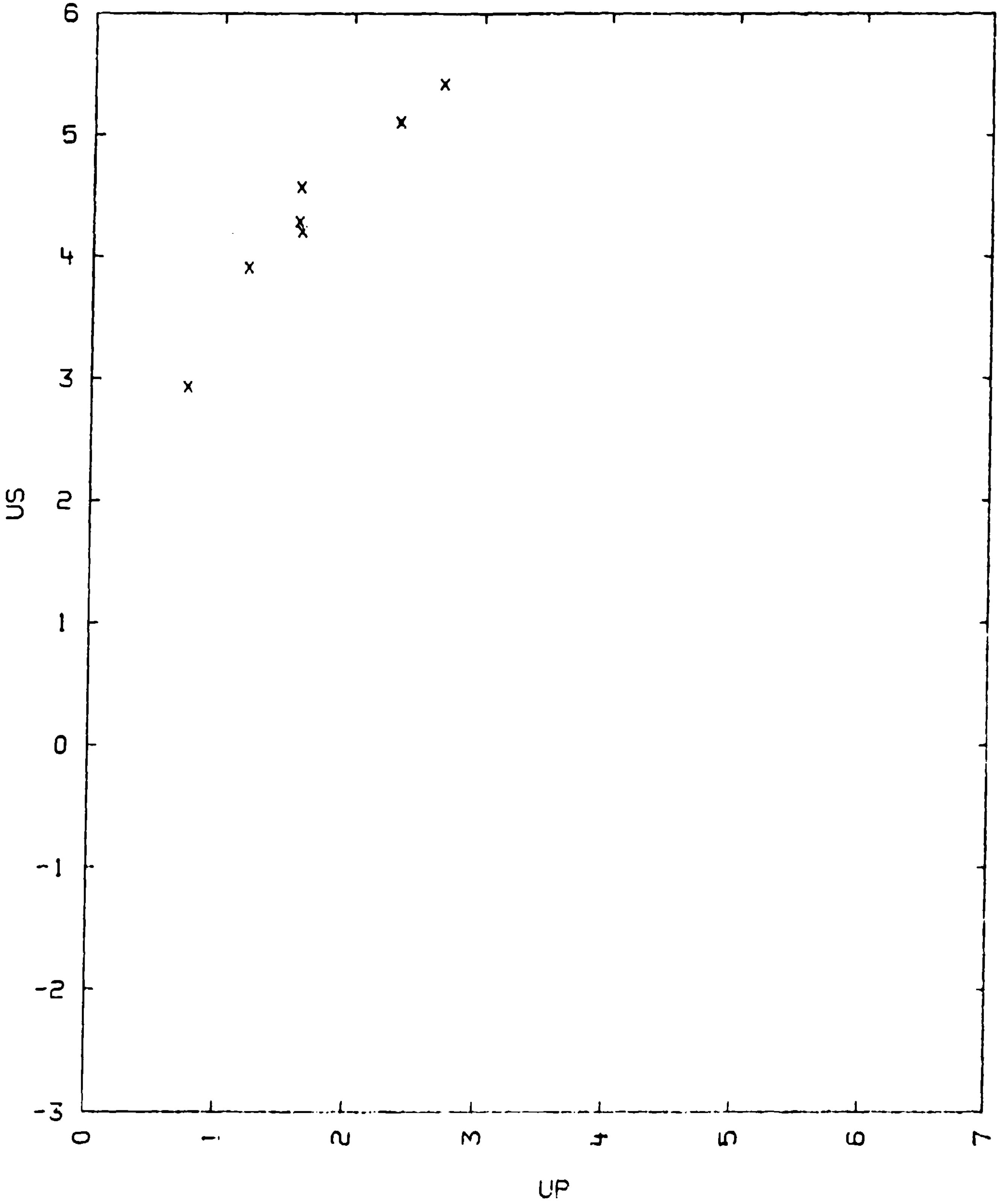
COMMENTS:

1) SOURCE: MAY, R. P. AND KINSEY, C. H.
SANDIA CORPORATION REPORT, SC-TM-67-737, OCT. 1967
SANDIA LABORATORY, ALBUQUERQUE, NEW MEXICO, U.S.A.
2)EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B
3)U.S.POLYMERIC FM 5215
UNION CARBIDE VYB-105-1/5 CARBON YARN,UNIDIRECTIONAL,PARALLEL WOUND FIBERS
EC 201 RESIN,38 WT PERCENT PRIOR TO PYROLYSIS
RESULTING MATERIAL IS SLIGHTLY POROUS
4)CL DETERMINED PERPENDICULAR TO LAMINATIONS BY T.GUESS SANDIA LABORATORY,ALBUQUERQUE,NEW MEXICO,PRIVATE COMMUNICATION.

TABLE I

CARBON PHENOLIC, FILAMENT WOUND AND PYROLISED

23-2 ?



EPOXY ARMSTRONG C-7 - ACTIVATOR A

VO = 0.835 CC/G

THE TABLE LISTS DENSITY IN G/CC, VELOCITY IN KM/SEC AND PRESSURE IN KBAR.

TABLE

RHOO	US	UP	P	V/VO
1.198	6.48	2.38	185.	0.633
-	6.48	2.36	183.	0.636
-	5.82	1.83	128.	0.686
-	5.73	1.90	130.	0.668
-	5.33	1.52	97.	0.715
-	4.69	1.18	66.3	0.748
-	4.07	0.78	38.0	0.808
-	3.70	0.60	26.6	0.838

US = 2.85 + 1.55•UP KM/SEC.
SIG.US = 0.09 KM/SEC.

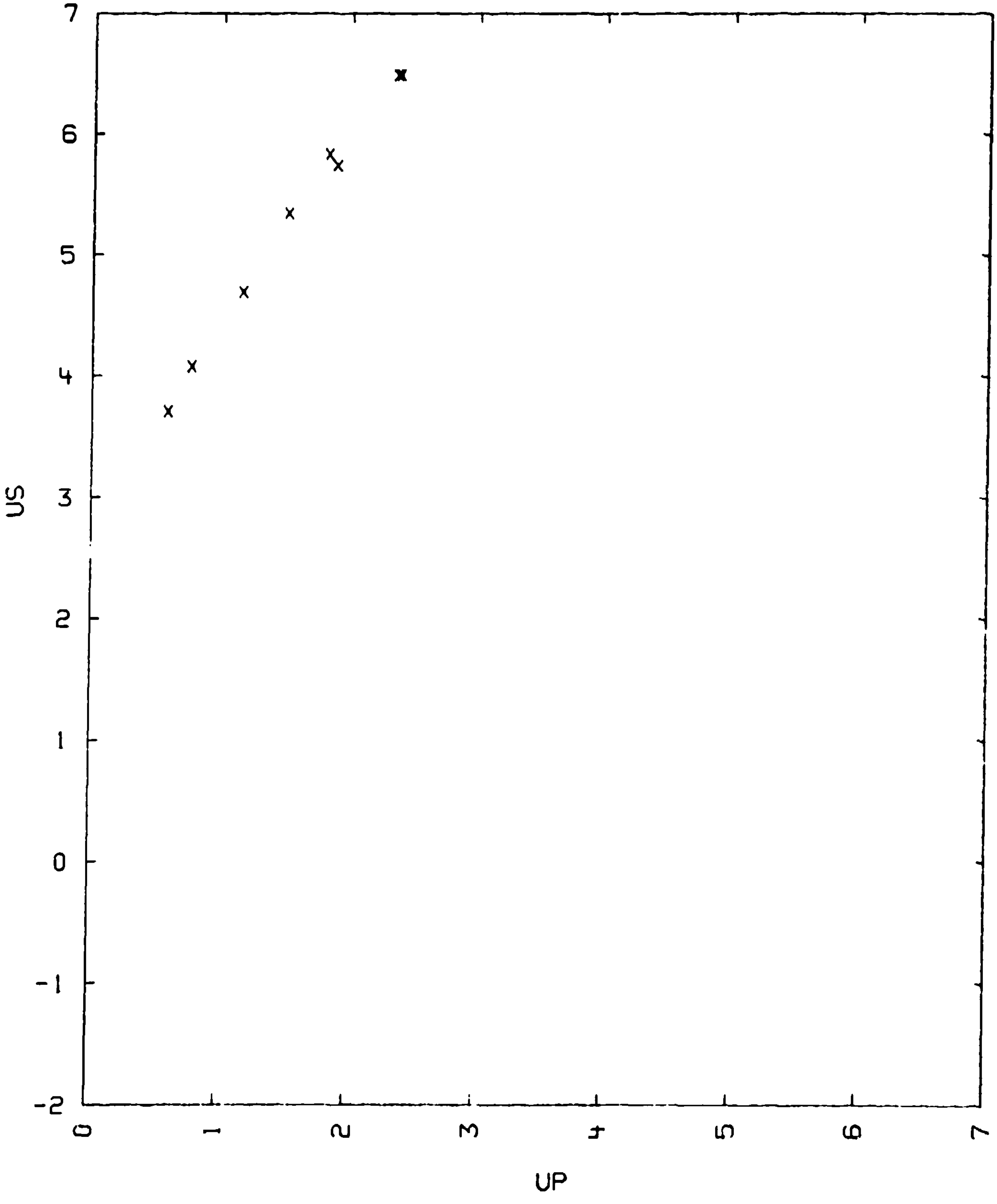
COMMENTS:

1) SOURCE: HAUVER, G. E. AND MELANI, A.
PRIVATE COMMUNICATION, JAN. 1969.
BALLISTICS RES. LAB., ABERDEEN PROVING GROUNDS
MARLAND, USA.
2) EXPERIMENTAL TECHNIQUE: H
DATA REDUCTION TECHNIQUE: B, STANDARDS AL AND PLEXIGLAS.
3) A PLEXIGLAS DISC (WITH US = 2.702 + 1.544•UP KM/SEC AND RHOO = 1.18) WAS USED TO DETERMIN THE LOCATION OF THE AL CROSS CURVE IN THE P VS. UP PLANE NEEDED FOR THE ANALYSIS
4) RESIN PURCHASED IN EARLY 1968

TABLE I

EPOXY ARMSTRONG C-7 - ACTIVATOR A

23-18-2-1---1 ?



23-18-2-1---2 7
EPOXY ARMSTRONG C-7 - ACTIVATOR R

VO = 0.830 CC/G

THE TABLE LISTS DENSITY IN G/CC, VELOCITY IN KM/SEC AND PRESSURE IN KBAR.

TABLE

RHOO	US	UP	P	V/VO
1.205	6.50	2.35	184.	0.638
-	6.46	2.45	191.	0.621
-	6.46	2.42	188.	0.625
-	5.70	1.94	133.	0.660
-	5.38	1.66	108.	0.691
-	5.24	1.53	96.6	0.708
-	4.64	1.18	66.0	0.746
-	4.01	0.79	38.2	0.803
-	3.69	0.60	26.6	0.837

US = 2.83 + 1.52*UP KM/SEC
SIG US = 0.07 KM/SEC.

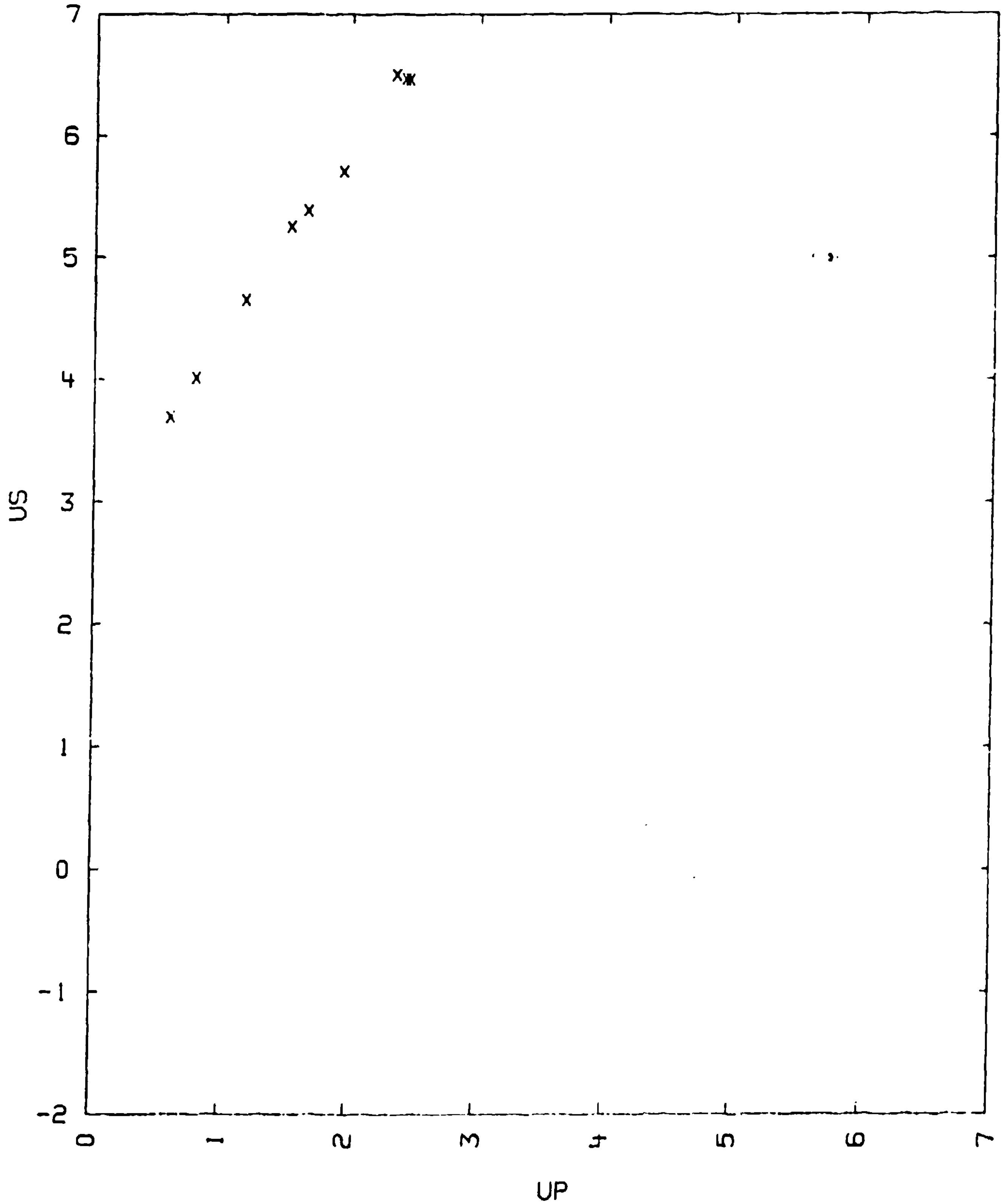
COMMENTS:

1) SOURCE: HAUVER, G. E. AND MELANI, A.
PRIVATE COMMUNICATION (1969)
BALLISTICS RESEARCH LABS., ABERDEEN PROVING GROUND, MARYLAND.
2) EXPERIMENTAL TECHNIQUE: H
DATA REDUCTION TECHNIQUE: B, STANDARDS AL AND PLEXIGLAS.
3) A PLEXIGLAS DISC (WITH US = 2.702 + 1.544*UP KM/SEC AND RHOO = 1.18) WAS USED TO DETERMINE THE LOCATION OF THE AL CROSS CURBE IN THE P VS. UP PLANE NEEDED FOR THE ANALYSIS
4) RESIN PURCHASED IN EARLY 1968

TABLE I

EPOXY ARMSTRONG C-7 - ACTIVATOR R

23-18-2-1---2 ?



23-10-2(2-1-3) ?
EXON

POLYVINYLCHLORIDE	(-(H2)C-C(CL)(H)-)N	NOTE 4
PLASTISIZERS	?	
FILLERS	?	

VO = 0.5947 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

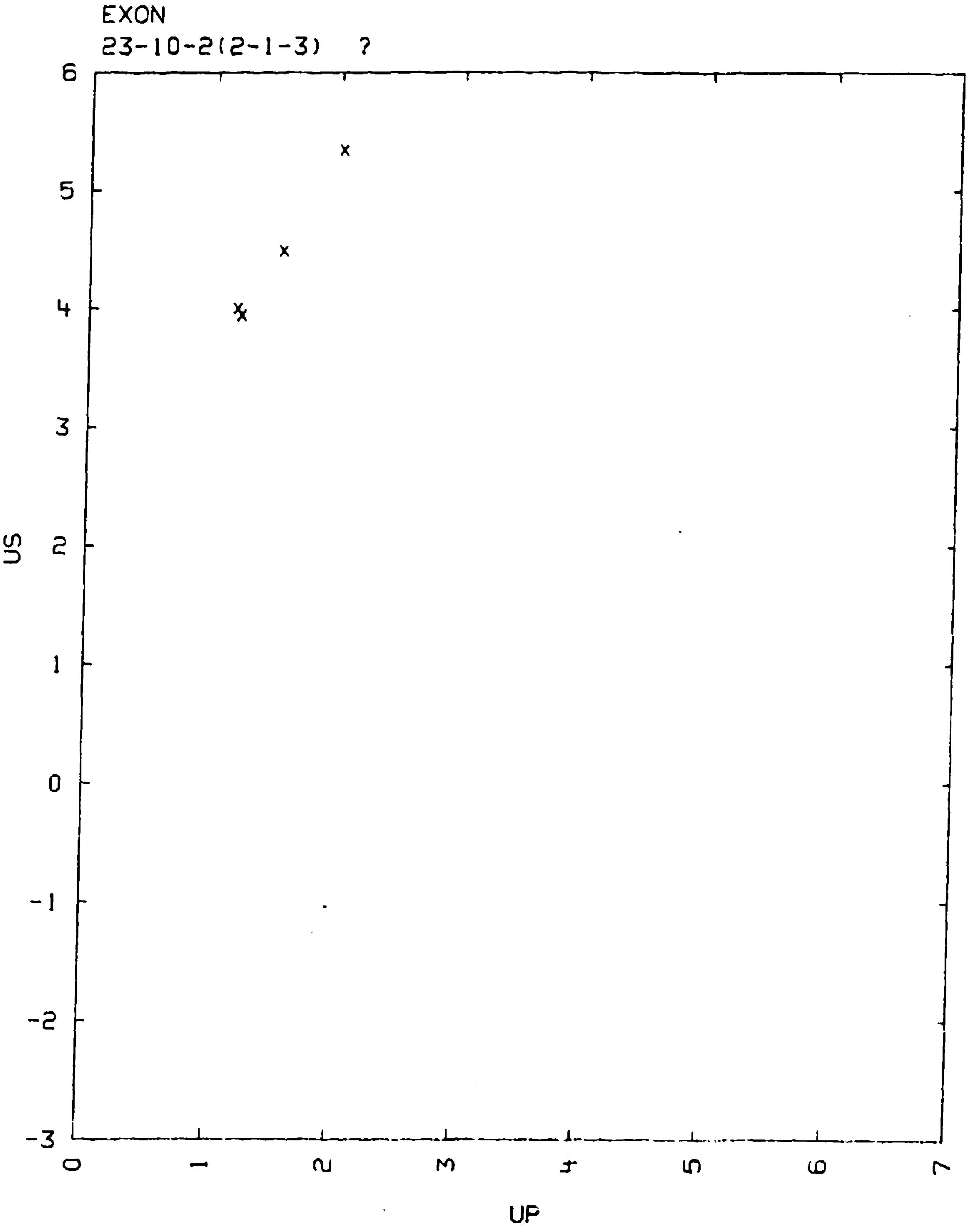
SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
1.682	3.99	1.19	80.	0.7018	2024 AL	6.44
1.681	3.94	1.22	81.	0.6904	2024 AL	6.47
1.681	4.48	1.55	117.	0.6540	2024 AL	6.82
1.681	5.33	2.02	181.	0.6210	2024 AL	7.42

US = 1.952 + 1.660*UP KM/SEC
SIGMA US = 0.063 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES. HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE:B
DATA REDUCTION TECHNIQUE: B
3) V(DP/DE) = 0.87
4) THE ABOVE MATERIAL IS DEFINED AS PVC (POLYVINYLCHLORIDE) WHICH BY 1966 SPECS NEED ONLY BE 51 PERCENT PURE TO BE SO DESIGNATED. RIGID UNFILLED PVC CONTAINS A MINIMUM OF LUBRICANT OR SOLVENT AND HAS A DENSITY RANGE OF 1.35 - 1.45 G/CC. THE ABOVE DENSITY IMPLIES A SIGNIFICANT AMOUNT OF FILLER, PERHAPS TI-O3 CA-O3 AND CARBON BLACK PRIVATE COMMUNICATION, PHILIP G. FLEMING, LLL

TABLE I



94-29-28-24--29-19-1---1 ?

GLASS CLOTH 181 LAMINATE WITH ALUMINUM PHOSPHATE RESIN

GLASS CLOTH:

SI-O2	53.5	WT. PERCENT
CA-O2	20.4	- -
AL2-O3	14.9	- -
B2-O3	5.	- -

RESIN AL-P-O4

VO = 0.500 TO 0.584 CC/G

THE TABLE LISTS DENSITY IN G/CC., VELOCITIES IN KM/SEC. AND PRESSURE IN KBAR.

TABLE

RHOO	US	UP	P	V/VO	MET
2.00	3.18	0.87	55.	0.73	A
2.00	3.48	1.15	80.	0.67	-
2.00	4.84	2.[illegible]	209.	0.54	-
2.00	5.10	2.33	237.	0.54	-
1.869	3.10	0.85	49.	0.73	-
1.869	3.84	1.71	123.	0.56	-
1.869	4.49	2.18	183.	0.51	-
1.669	4.85	2.47	224.	0.49	-
1.869	2.90	0.86	55.	0.70	F
1.869	3.66	1.58	108.	0.57	-
1.869	4.02	1.78	134.	0.56	-
1.869	4.79	2.34	210.	0.51	-
1.711	2.49	0.73	31.	0.71	A
1.711	2.53	0.89	39.	0.65	F
1.711	4.60	2.45	193.	0.47	-
1.711	4.64	2.48	197.	0.47	-

US = 2.014 + 1.305•UP KM/SEC., FOR RHOO = 2.00 G/CC.
US = 1.919 + 1.190•UP KM/SEC., FOR RHOO = 1.869 G/CC.
US = 1.485 + 1.270•UP KM/SEC., FOR RHOO = 1.711 G/CC.

COMMENTS:

1) SOURCE: MAY, R. P. AND KINSEY, C. H.
SANDIA CORPORATION REPORT, SC-DR-67-2958, MARCH 1968
SANDIA LABORATORY, ALBUQUERQUE, NEW MEXICO, U.S.A.

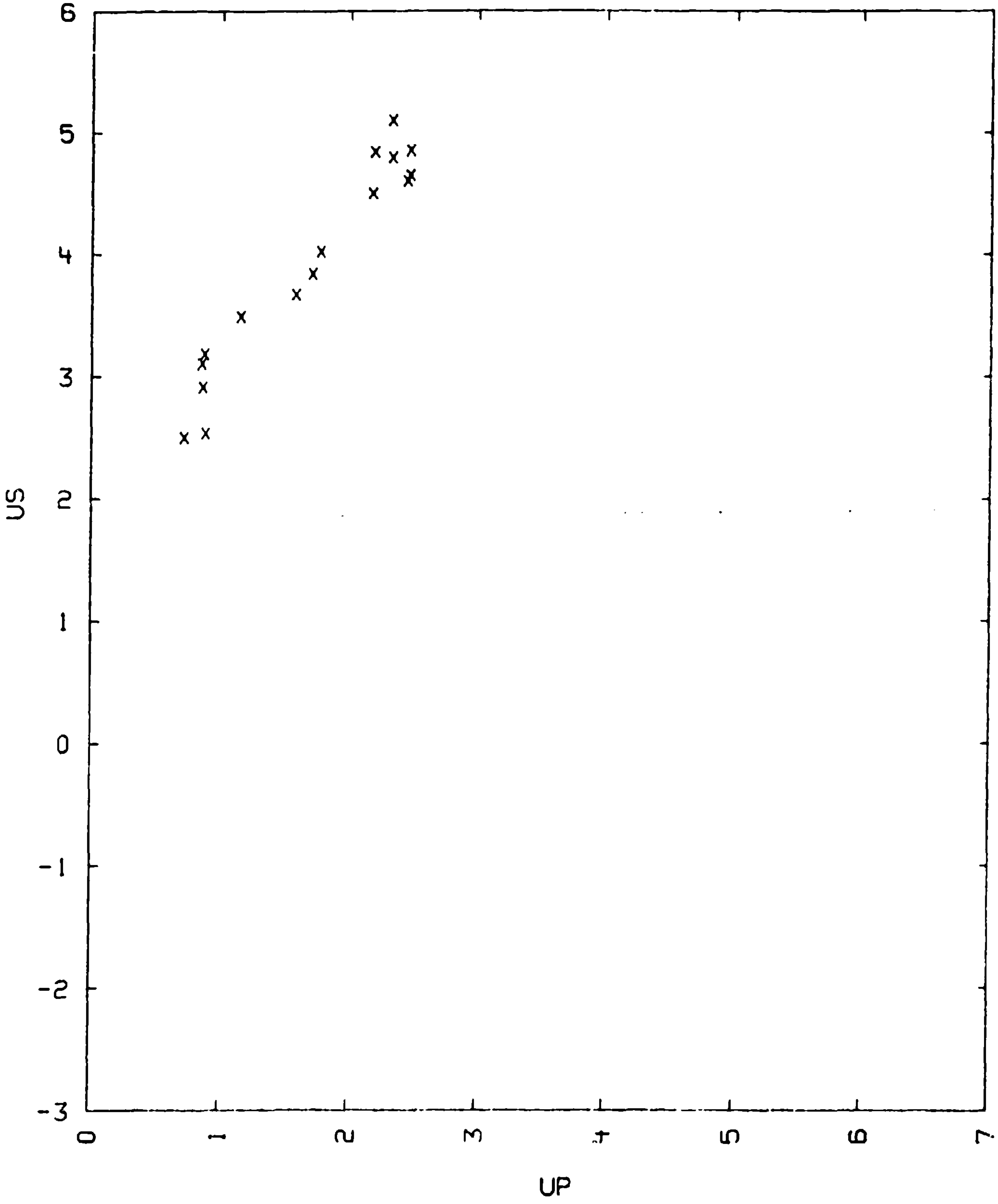
2) EXPERIMENTAL TECHNIQUE A AND F
DATA REDUCTION METHOD B

3) THE SHOCK DIRECTION WAS NORMAL TO THE LAMINATIONS.
NO TWO WAVE SYSTEMS WERE OBSERVED.

TABLE I

GLASS CLOTH 181 LAMINATE WITH ALUMINUM PHOSPHATE R

94-29-28-24--29-19-1---1 ?



23-18-2-1-- ?
MELMAC

MELAMINEFORMALDEHYDE
MELAMINE (C-N)3-(N-H2)3
FORMALDEHYDE H2-C-O
FILLER

VO = 0.703 - 0.669 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
1.494	4.80	1.03	74.	0.7854	2024 AL	6.32
1.411	4.86	1.04	71.	0.7860	2024 AL	6.32
1.494	5.40	1.50	121.	0.7222	2024 AL	6.80
1.494	5.31	1.52	121.	0.7137	2024 AL	6.81
1.411	5.33	1.54	116.	0.7111	2024 AL	6.80
1.411	5.13	1.56	113.	0.6959	2024 AL	6.81
1.494	6.09	2.01	183.	0.6700	2024 AL	7.33
1.411	6.00	2.05	174.	0.6583	2024 AL	7.33

US = 3.505 + 1.213*UP KM/SEC
SIGMA US = 0.137 KM/SEC

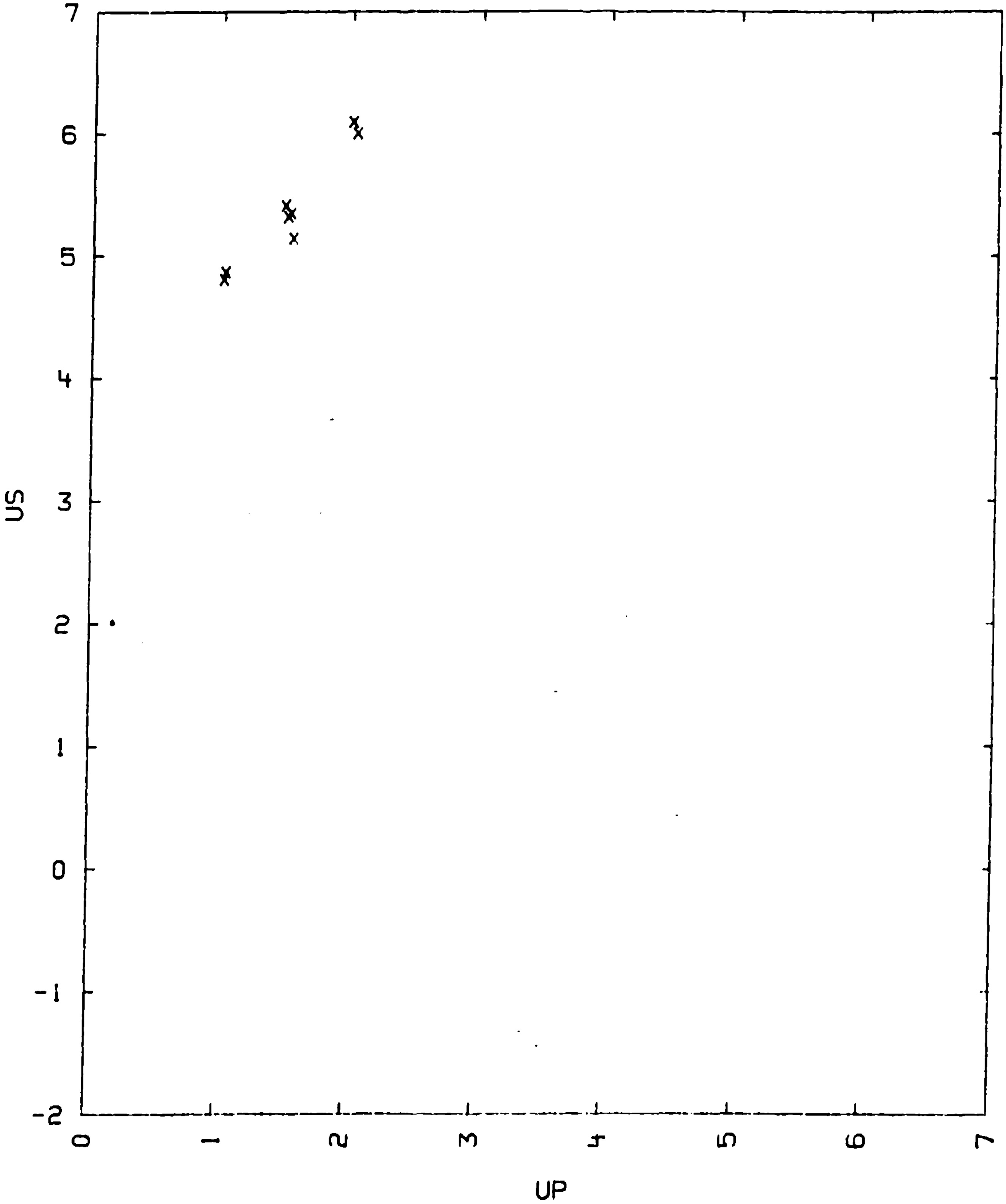
COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B
3) THE PRECISE COMPOSITION OF THIS SAMPLE IS NOT KNOWN

4) V(DP/DE) = 0.89

TABLE I

MELMAC
23-18-2-1-- ?



VO = 3.5 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
0.270	2.19	1.76	10.	0.1963	2024 AL	6.55
0.280	2.67	2.26	17.	0.1536	2024 AL	6.91
0.280	5.28	4.12	61.	0.2197	2024 AL	8.30
0.280	5.25	4.14	61.	0.2114	2024 AL	8.32
0.270	5.82	4.68	74.	0.1959	2024 AL	8.72
0.290	6.39	4.99	92.	0.2191	2024 AL	8.98
0.290	6.32	5.02	92.	0.2057	2024 AL	9.00
0.280	6.77	5.06	96.	0.2526	2024 AL	9.04
0.280	6.39	5.08	91.	0.2050	2024 AL	9.03
0.270	6.81	5.24	96.	0.2305	2024 AL	9.16
0.290	7.64	6.13	136.	0.1976	2024 AL	9.86
0.280	8.29	6.19	144.	0.2533	2024 AL	9.32

US = -.257 + 1.333*UP KM/SEC
SIGMA US = 0.180 KM/SEC

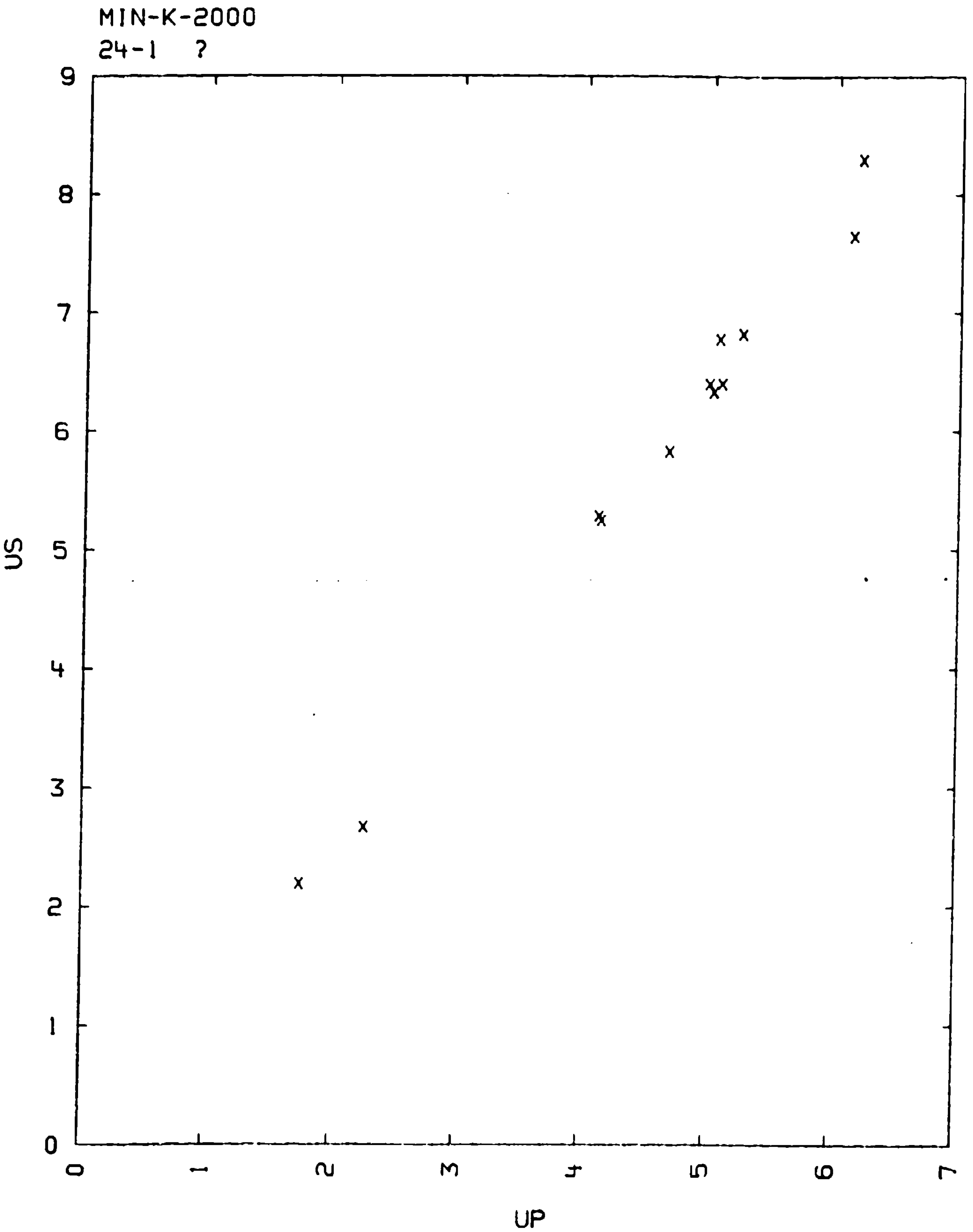
COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII

2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B

3) MIN-K-2000 IS A VIBROUS INSULATING MATERIAL FROM THE JOHNS MANVILLE CO. THE CHEMICAL COMPOSITION IS UNDETERMINED

TABLE I



23-18-2-1 ?
POLYRUBBER

VO = 0.9814 - 1.30 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE I

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
1.012	3.23	1.28	42.	0.6037	2024 AL	6.36
1.014	3.33	1.30	44.	0.6096	2024 AL	6.38
1.015	4.12	1.73	72.	0.5801	2024 AL	6.78
1.009	4.06	1.78	73.	0.5616	2024 AL	6.81
1.019	5.19	2.30	122.	0.5568	2024 AL	7.33

US = 0.854 + 1.865•UP KM/SEC
SIGMA US = 0.080 KM/SEC

TABLE II

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
0.784	2.78	1.37	30.	0.5072	2024 AL	6.37
0.771	2.80	1.38	30.	0.5071	2024 AL	6.38
0.778	3.66	1.84	52.	0.4973	2024 AL	6.78
0.775	3.64	1.90	54.	0.4780	2024 AL	6.82
0.775	4.34	2.51	84.	0.4217	2024 AL	7.33
0.775	4.56	2.52	89.	0.4474	2024 AL	7.36
0.769	4.46	2.54	87.	0.4305	2024 AL	7.37

US = 0.891 + 1.423•UP KM/SEC
SIGMA US = 0.105 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B (STANDARD BASE PLATE AS SHOWN)

TABLE I

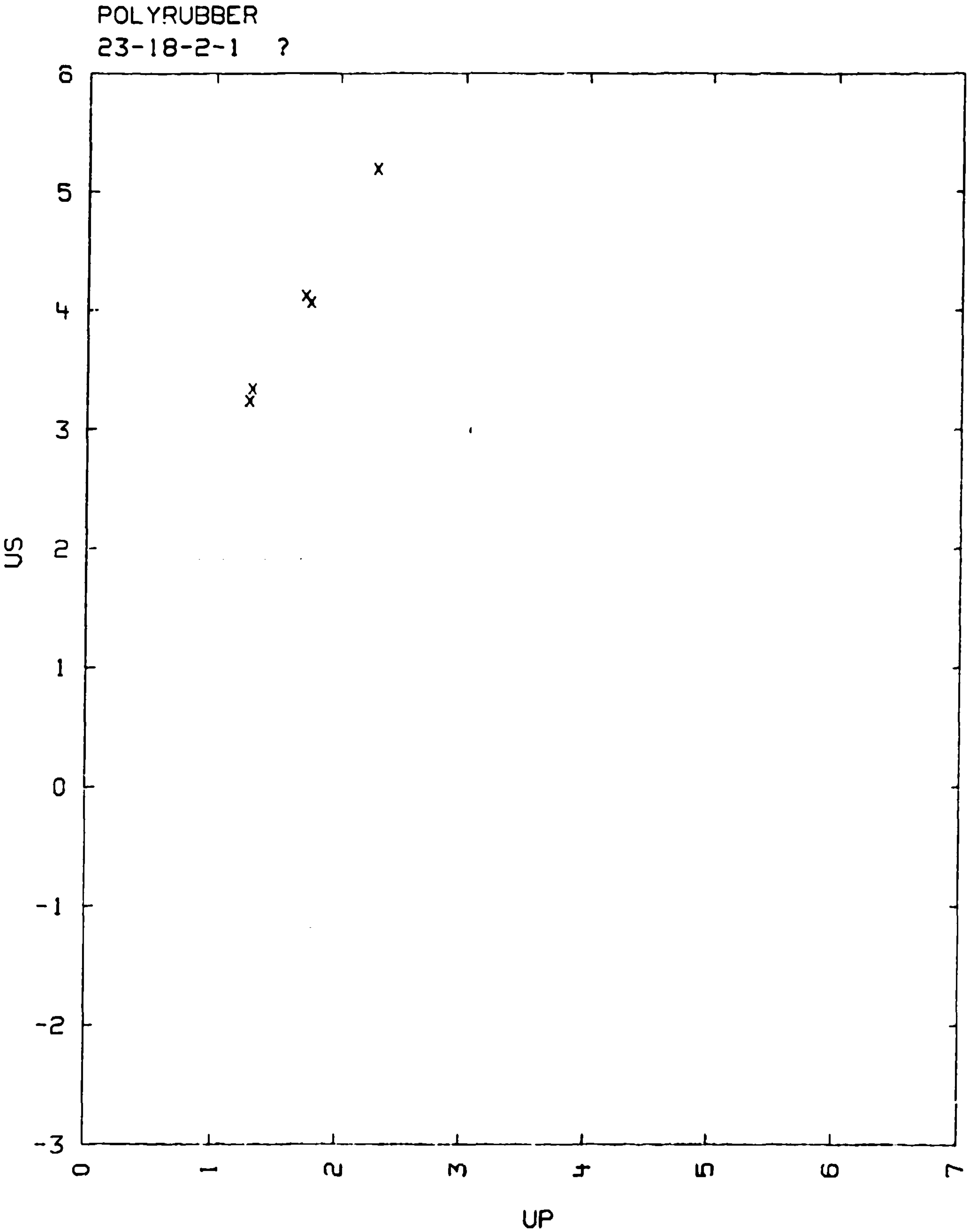
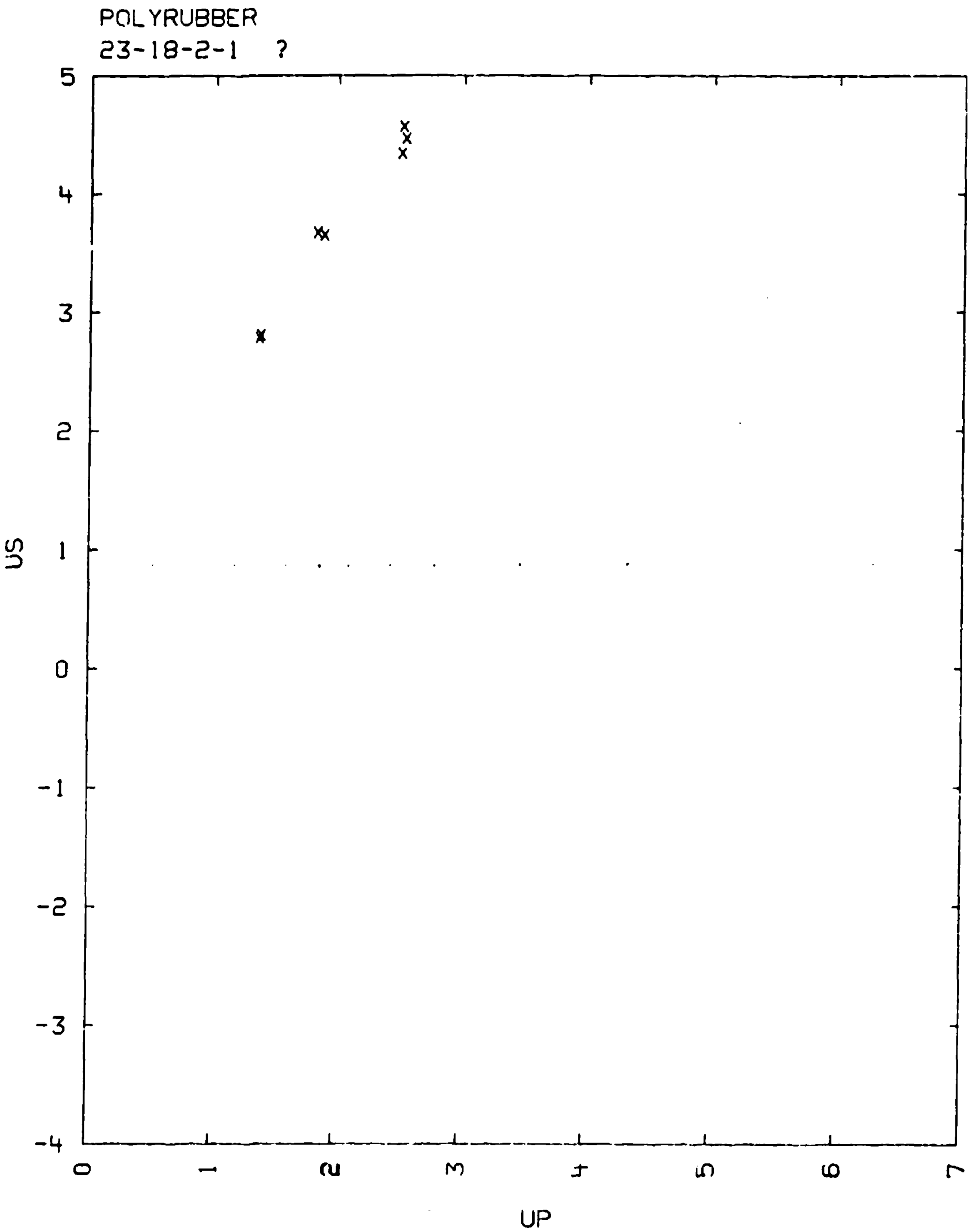


TABLE II



29-24-1 ?
PUMICE, MONO CRATER

SI-O2	75.7	VOLUME	PERCENT
AL2-O3	13.0	-	-
VA2-O	4.0	-	-
K2-O	4.5	-	-
H2-O+	0.71	-	-
FE2-O3	0.626	-	-
FE-O	0.44	-	-

POROSITY (CALCULATED) 78 PERCENT

VOI = 0.3937 CC/G
VO = 0.1818 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES ARE IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UP	P	V/VO
0.55	2.77	2.32	35	0.166
-	3.45	2.96	56	0.144
-	6.59	5.31	192	0.195
-	7.81	6.19	266	0.208

US =

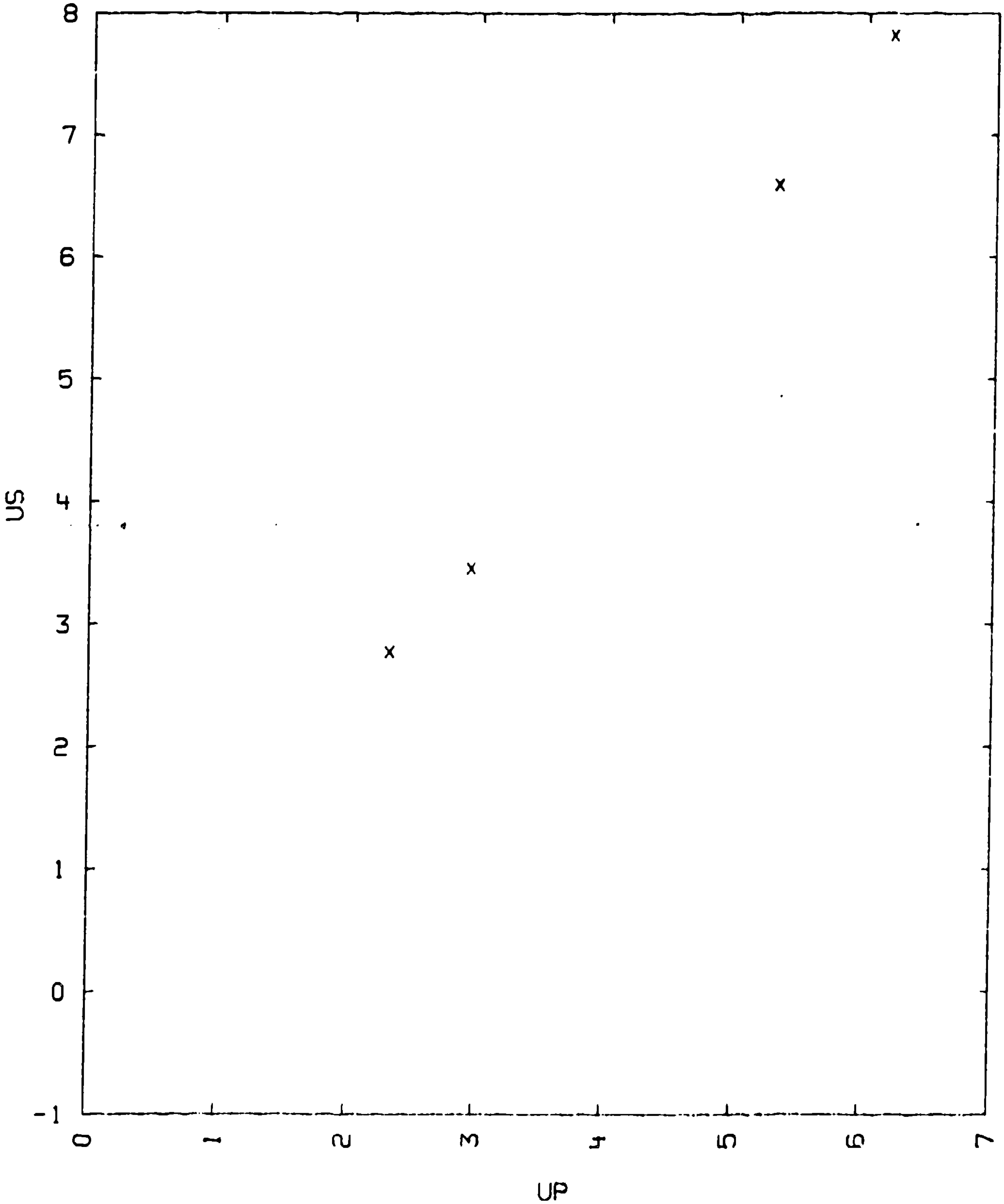
COMMENTS:

1) SOURCE: JONES, A. H., ISBELL, W. M., SHIPMAN, F. N., PERKINS, R. D., GREEN, S. J. AND MAIDEN, C. J.
REPORT MSL-68-9; CONTRACT NASA 2-3927
MATERIALS AND STRUCTURE LABORATORY
GENERAL MOTORS TECHNICAL CENTER, MICHIGAN, USA 48090
2) EXPERIMENTAL TECHNIQUE A:
DATA REDUCTION TECHNIQUE A: ASSUMING THE PARTICULE VELOCITY (UP) IS EQUAL TO ONE HALF OF THE PROJECTILE IMPACT VELOCITY.
STANDARD MATERIAL USED WHERE OFHC COPPER AND FANSTEEL-77 ALLOY. THE COPPER STANDARD US-UP HUGONIOT RELATIONSHIP IS GIVEN BY THE FOLLOWING EQUATION:
US = 3.96 + 1.49*UP KM/SEC
WHERE RHOO = 8.93 G/CC
FOR THE FANSTEEL US-UP HUGONIOT RELATIONSHIP SEE MATERIAL 53--39--36---2.
3) THESE PRESSURES WERE ACHIEVED BY USING A TWO-STAGE LIGHT GAS GUN. THE PROJECTILE IMPACT VELOCITY AND TILT WERE MEASURED BY FLASH X-RAYS. THE IMPACTOR VELOCITY MEASURING SYSTEM CONSISTED OF MEASURING THE INTERVAL TIME BETWEEN TWO SHORT DURATION FLASH X-RAYS LOCATED JUST AHEAD OF THE TARGET. THE IMPACT VELOCITY IS MEASURED ACCURATE TO 0.2 PERCENT.
4) THE MEASURED SHOCK VELOCITY (US) IS A AVERAGE VALUE THROUGH THE SPECIMENT. FOR THE SAMPLES OF THE SIZE USED IN THESE EXPERIMENTS

THERE MAY BE A NON-LINEAR SHOCK PROPAGATION DUE TO THE HIGH POROSITY WHICH WOULD PRODUCE IN ERROR IN THE US MEASUREMENTS.

TABLE I

PUMICE, MONO CRATER
29-24-1 ?



24-1--23-18-2-1(?)---1
QUARTZ PHENOLIC, FILAMENT WOUND

FIBERS:
SI-02 99.5 PERCENT
PHENOLIC

VO = 0.536 CC/G.

THE TABLE LISTS DENSITY IN G/CC., VELOCITY IN KM/SEC. AND PRESSURE IN KBAR.

TABLE

RHOO	US	UP	P	V/VO
1.834	4.104	0.696	52.4	0.830
1.840	3.77	0.78	54.0	0.79
1.875	4.05	0.82	63.0	0.80
1.86	4.156	1.083	83.7	0.739
1.861	4.40	1.09	89.0	0.75
1.86	4.51	1.423	119.4	0.684
1.84	4.678	1.538	132.4	0.671
1.638	4.58	1.56	131.0	0.66
1.840	4.60	1.63	137.0	0.65
1.870	4.72	1.73	153.0	0.63
1.856	4.95	2.1[illegible]	194.0	0.57
1.840	5.02	2.12	196.0	0.58
1.86	5.030	2.143	200.6	0.573
1.86	5.155	2.358	226.1	0.543
1.880	5.20	2.36	231.0	0.55
1.840	5.21	2.43	233.0	0.53

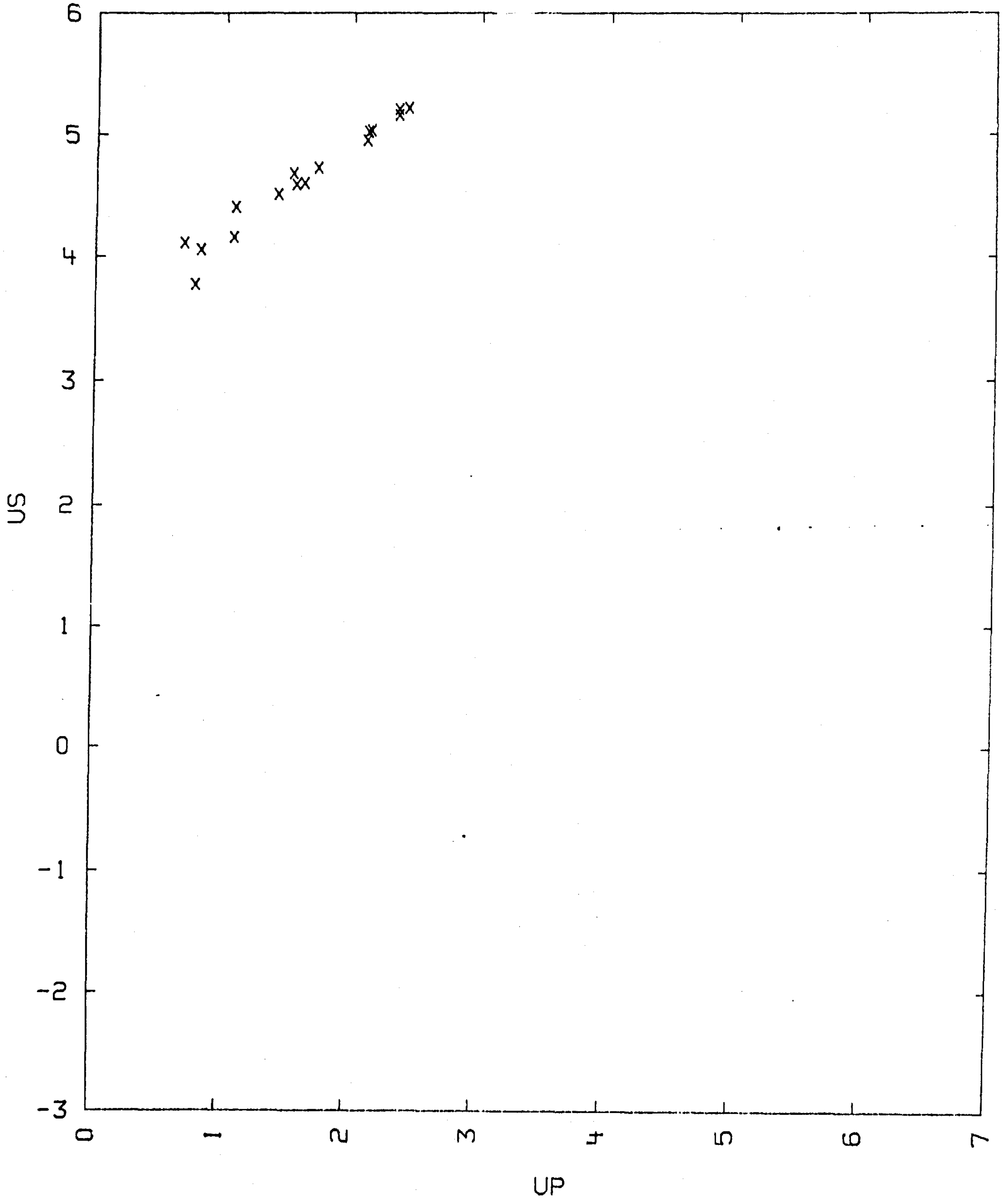
US = 3.39 + 0.77*UP KM/SEC.

COMMENTS:

1) SOURCE: MAY, R. P. AND KINSEY
SANDIA CORPORATION REPORT, SC-TM-67-642, SEPT. 1967
SANDIA LABORATORY, ALBUQUERQUE, NEW MEXICO, U.S.A.
2)EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B
3)20 END QUARTZ ROVING
AH-2 PHENOLIC RESIN 20 PERCENT BY WEIGHT
FILAMENTS WOUND PARALLEL TO EACH OTHER AND BEING UNIDIRECTIONAL
RESULT IN ANISOTROPIC PROPERTIES.

TABLE I

QUARTZ PHENOLIC, FILAMENT WOUND
24-1--23-18-2-1(?)---1



24-1---23-18-2-1(?)---2
QUARTZ PHENOLIC

QUARTZ:
PHENOLIC:

V0 = 0.556

THE TABLE LISTS RHO0 IN G/CC, VELOCITIES IN KM/SEC AND P IN KBARS. CU= COPPER, FS= FANSTEEL, WF= WEIGHTING FACTOR AND DIR= DIRECTION. PAR MEANS THAT THE QUARTZ FIBRES ARE PARALLEL AND PERP, THAT THEY ARE PERPENDICULAR TO THE PLANE OF THE SHOCK FRONT.

TABLE

- - - - - - - - - SAMPLE					- - - - - - - - -	- - IMPACTOR - -		
DIR	RHO0	US	UP	P	V/V0	MAT	U	WF
PAR	1.80	4.479	1.341	108.	.7006	CU	1.619	0
PAR	1.80	5.248	2.164	204.	.5875	CU	2.654	0
PAR	1.80	5.343	2.522	243.	.5281	CU	3.088	1
PAR	1.80	7.160	3.793	489.	.4703	CU	4.798	1
PAR	1.80	10.978	6.635	1311.	.3956	FS	7.985	1
PERP	1.80	4.357	1.172	92.	.7310	CU	1.412	0
PERP	1.80	5.211	1.991	187.	.6179	CU	2.444	0
PERP	1.80	5.234	2.015	190.	.6149	CU	2.475	0
PERP	1.80	5.735	2.750	284.	.5205	CU	3.397	1
PERP	1.80	5.733	2.772	286.	.5165	CU	3.423	0
PERP	1.80	7.032	3.738	473.	.4685	CU	4.718	1

US = 1.949 + 1.364*UP FOR UP ABOVE 2.3 KM/SEC
SIG.US = 0.016 KM/SEC.

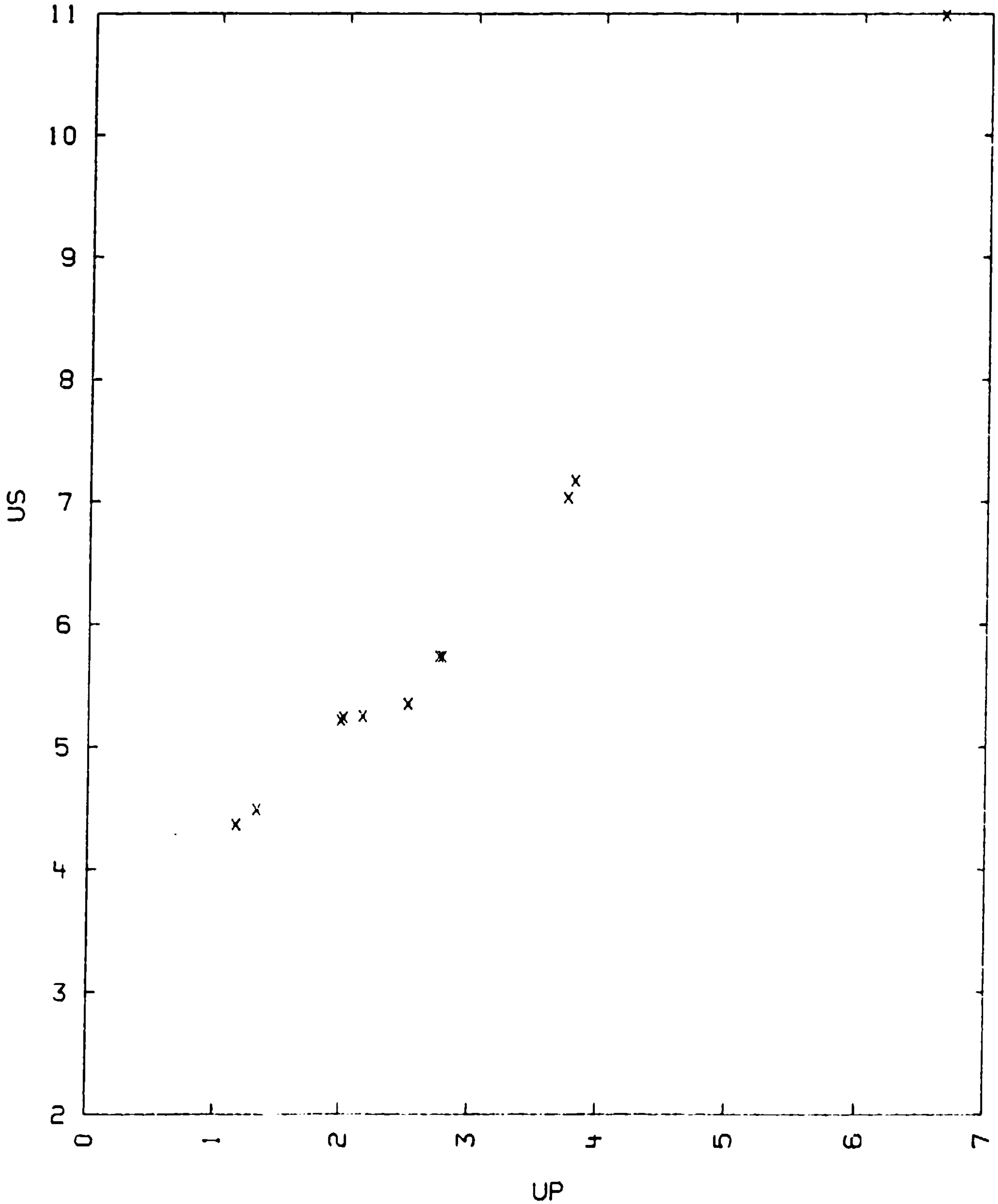
COMMENTS:

1) SOURCE: ISBELL W.M., SHIPMAN F.H. AND JONES A.H.
HUGONIOT EQUATION OF STATE OF ELEVEN MATERIALS TO FIVE MBARS.
MATERIALS SCIENCE LABORATORY REPORT: MSL-68-13
2) EXPERIMENTAL TECHNIQUE: A
DATA REDUCTION METHOD : A
3) NOMINAL UNCERTAINTIES ARE: (SIG.US)/US = .005 AND (SIG.U)/U = .005
THE UNCERTAINTY OF UP, P AND V/V0 OF ENTRY 5 WERE 2, 2 AND 3 PERCENT RESPECTIVELY BECAUSE OF A SOMEWHAT HIGHER UNCERTAINTY IN THE PROJECTILE VELOCITY.

TABLE I

QUARTZ PHENOLIC

24-1---23-18-2-1(?)---2



23-18-2-1 ?
SELECTRON (POLYESTER)

VO = 0.822 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

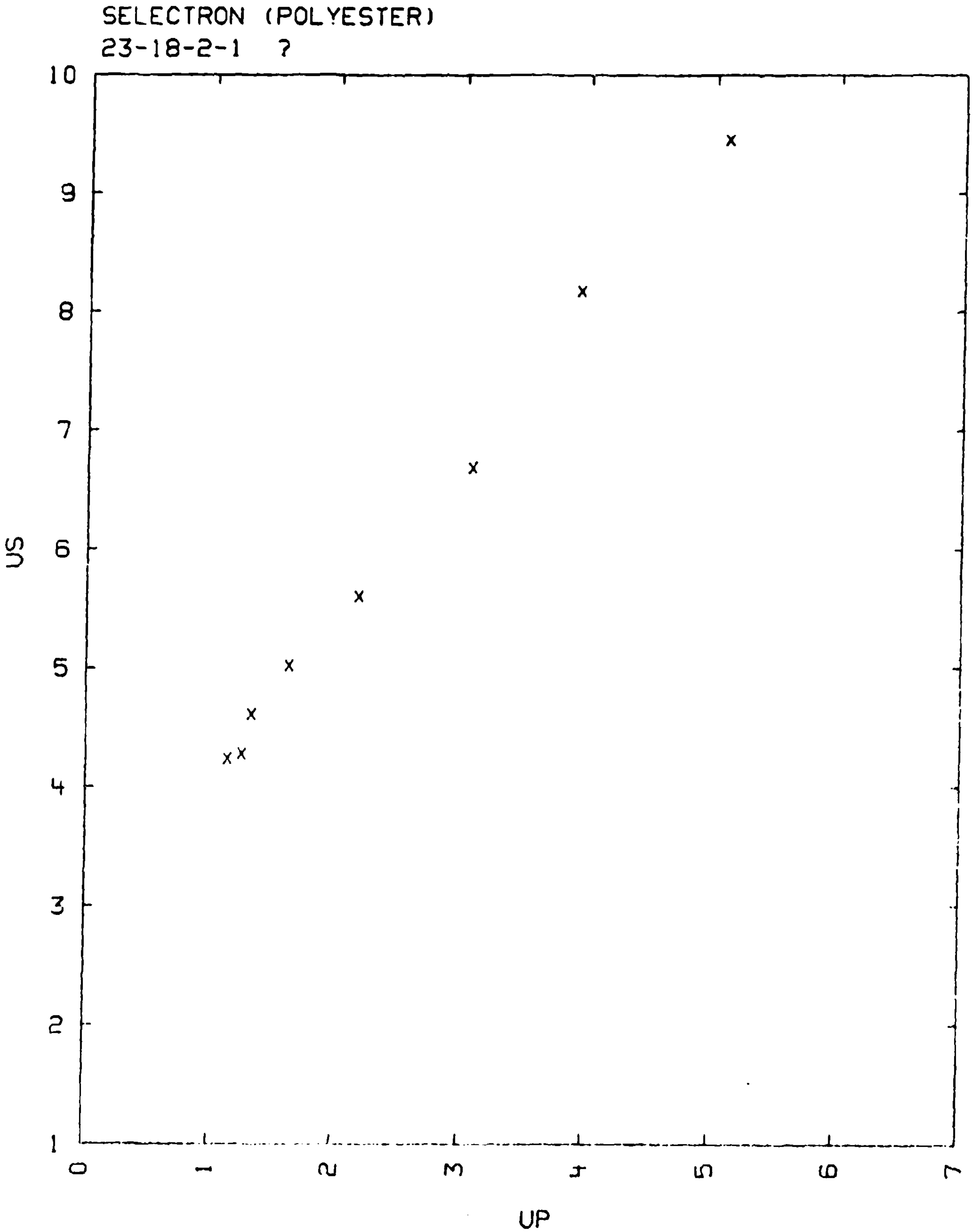
SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
1.219	4.23	1.14	59.	0.7305	2024 AL	6.33
1.215	4.28	1.26	66.	0.7056	2024 AL	6.44
1.215	4.61	1.34	75.	0.7093	2024 AL	6.53
1.215	5.02	1.64	100.	0.6733	2024 AL	6.82
1.219	5.60	2.18	149.	0.6107	2024 AL	7.34
1.216	6.68	3.08	250.	0.5389	2024 AL	8.24
1.215	8.16	3.94	391.	0.5172	2024 AL	9.16
1.215	9.45	5.09	584.	0.4614	2024 AL	10.35

US = 2.722 + 1.333*UP KM/SEC
SIGMA US = 0.128 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B
3) SELECTRON IS A TRADE NAME FOR A LINE OF PITTSBURGH PLATE GLASS POLYMERS - THIS SAMPLE IS ONE OF ITS POLYESTER RESINS

TABLE I



EDIT TEST

BOX V72 PLTR

TV80LIB DD80 OUTPUT........... 10:09:41U 06/15

34 FRAMES PLOTTED

EDIT TEST

BOX V72 PLTR

TV80LIB DD80 OUTPUT............ 10:09:41U 06/15

EDIT TEST

BOX V72 PLTR

TV80LIB DD80 OUTPUT............ 10:09:41U 06/15